DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
NUCLEAR WASTE DISPOSAL FUND

PROPOSED APPROPRIATION LANGUAGE

For nuclear waste disposal activities to carry out the purposes of Public Law 97-425, as amended, including the acquisition of real property or facility construction or expansion, [$160,000,000] $190,000,000, to remain available until expended, to be derived from the Nuclear Waste Fund; of which [$4,000,000 shall be available to the Nuclear Regulatory Commission to licence a multi-purpose canister design; and] of which not to exceed $4,875,000 may be provided to the State of Nevada, solely to conduct scientific oversight responsibilities pursuant to the Nuclear Waste Policy Act of 1982, (Public Law 97-425), as amended; and of which not to exceed [$5,000,000] $5,540,000, may be provided to affected units of local governments, as defined in Public Law 97-425, to conduct appropriate activities pursuant to the Act: *Provided,* That the distribution of the funds [to] as determined by the units of local government shall be [determined] approved by the Department of Energy : *Provided further,* That the funds shall be made available to the State and units of local government by direct payment: *Provided further*, That within ninety days of the completion of each Federal fiscal year, the State and each local entity shall provide certification to the Department of Energy, that all funds expended from such payments have been expended for activities as defined in Public Law 97-425. Failure to provide such certification shall cause such entity to be prohibited from any further funding provided for similar activities: *Provided further*, That none of the funds herein appropriated may be: (1) used directly or indirectly to influence legislative action on any matter pending before Congress or a State legislature or for lobbying activity as provided in 18 U.S.C. 1913; (2) used for litigation expenses; or (3) used to support multistate efforts or other coalition building activities inconsistent with the restrictions contained in this Act: [*Provided further,* That none of the funds provided herein shall be distributed to the State of Nevada by direct payment, grant, or other means, for financial assistance under section 116 of the Nuclear Waste Policy Act of 1982, as amended:] *Provided further,* That the foregoing proviso shall not apply to payments in lieu of taxes under section 116(c)(3)(A) of the Nuclear Waste Policy Act of 1982, as amended.

EXPLANATION OF CHANGES

In accordance with the direction contained in Energy and Water Appropriation Act for fiscal year 1998, no funds were provided to the State of Nevada to conduct scientific oversight activities as described by the Nuclear Waste Policy Act of 1982, (Public Law 97-425), as amended. The fiscal year 1999 proposed Appropriation language requests that funding be provided, as envisioned by Section 116(c) of that Act, to the State of Nevada to enable the citizens most directly impacted by the Yucca Mountain Project to remain informed and to participate in a meaningful way in the day to day program actions.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
ENERGY AND WATER DEVELOPMENT
(tabular dollars in thousands, narrative in whole dollars)

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
EXECUTIVE BUDGET SUMMARY

MISSION

The mission of the Office of Civilian Radioactive Waste Management (OCRWM) is to manage and dispose of the Nation's spent nuclear fuel and high-level radioactive waste. The office provides leadership in developing and implementing strategies to accomplish this mission that assure public and worker health and safety, protect the environment, merit public confidence, and are economically viable.

The Nuclear Waste Policy Act of 1982 established the Federal Government's responsibility and statutory framework to provide for the permanent disposal of the high-level radioactive waste resulting from the clean-up of the Cold War weapons complex and commercially generated spent nuclear fuel. It further directed that the generators and owners of these wastes be responsible for the costs of their management and disposal. The Act authorizes the Department of Energy to develop a system to safely manage and permanently dispose of the spent nuclear fuel accumulating at commercial reactors. The primary goal of the Act is the siting, construction, and operation of a mined geologic repository.

As a result of a Presidential determination in 1985, the Department proceeded with plans and actions to dispose of high level defense waste together with commercial spent nuclear fuel. And, as originally enacted, the Act also directed the Department to study the need for and feasibility of a monitored retrievable storage facility. The Department submitted a site-specific proposal for the development of such a facility but the siting action was nullified by Congress in the Nuclear Waste Policy Amendments Act of 1987.

The Act directed the Department of Energy to undertake a national screening exercise to evaluate candidate repository sites. In 1986, the Department recommended three sites to the President for further study as possible geologic repositories. In the Nuclear Waste Policy Amendments Act of 1987, the Congress directed the Department to continue to investigate only one potential repository site, at Yucca Mountain, Nevada, and to report on the need for a second repository between 2007 and 2010.

STRATEGY

In FY 1998, the Department received an appropriation of $346 million for the Office of Civilian Radioactive Waste Management (see major changes section for details). The Conference Report to the 1998 Energy and Water Appropriations Act provided no additional guidance to the Office of Civilian Radioactive Waste Management related to its implementation of the provisions contained in the Nuclear Waste Policy Act, as amended. The Office of Civilian Radioactive Waste Management, therefore, continued in FY 1998 to apply appropriated funds for activities as directed by the Conference Report that accompanied the 1997 Energy and Water Appropriations Act. The Office of Civilian Radioactive Waste Management, as directed by that Conference Report, was to use funds in accordance with the Program's revised draft Program Plan.

Figure 1 - The Tunnel Boring Machine "daylights" at Yucca Mountain.

The revised draft Program Plan, issued in May 1996, placed the focus of the Program on completing the necessary technical and scientific work at the Yucca Mountain site to maintain the long-term objective of initiating repository operations in 2010. The Department continues to make substantial progress in achieving the national goal of geologic disposal of spent nuclear fuel and high-level radioactive waste. The picture on the left gives graphic evidence of the progress made at the Yucca Mountain site. On April 25, 1997, the Department "daylighted" (i.e., completed) a five-mile long, 25 foot diameter tunnel using a tunnel boring machine. The picture shows the cutter head of the tunnel boring machine coming out of the end of the tunnel. The completion of this tunnel was a major milestone in the Program's history. It is to be used as an Exploratory Studies Facility to house scientific experiments being conducted within the area of the proposed repository facility and will be of invaluable assistance as the Program moves forward with the evaluation of the suitability of the site for potential development as a geologic repository.

The Program plans to complete, in FY 1998, the construction of a cross-drift off of the main Exploratory Studies Facility. A comprehensive suite of scientific studies will be carried out in this new cross-drift in FY 1999 to enhance the Program's knowledge of the entire repository block. Figure 2 depicts the layout of the existing 5-mile long Exploratory Studies Facility and the planned cross-drift.

The strategy for the Yucca Mountain Site Characterization Project was redefined in the revised draft Office of Civilian Radioactive Waste Management Program Plan. There are four near-term objectives for that project, accomplishment of which will maintain the momentum towards a national decision on the geologic disposal option. Those objectives are as follows: 1) completion of the updating of the regulatory framework for the Yucca Mountain site; 2) completion of the viability assessment for Yucca Mountain in 1998; 3) recommendation of the repository site to the President in 2001, if the site is found to be suitable; and 4) submission of a License Application for constructing a repository to the Nuclear Regulatory Commission in 2002.

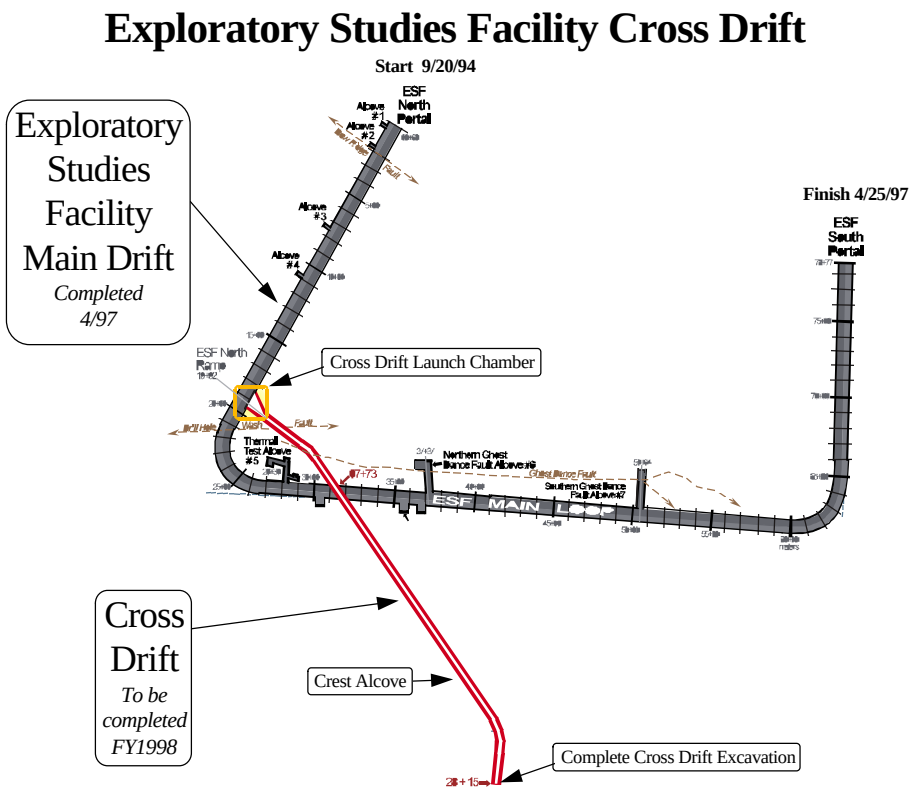

Figure 2 - Diagram of the Exploratory Studies Facility and Cross Drift.

FY 1999 is a critical transitional year for the Office of Civilian Radioactive Waste Management program, particularly with respect to the Yucca Mountain Site Characterization Project. In prior fiscal years, the Program devoted significant resources to the construction/operations arena. We constructed, utilizing a tunnel boring machine, a unique underground laboratory - the Exploratory Studies Facility - that gave us direct access to the proposed repository block in order to obtain necessary scientific data. We are accelerating the transition of the Yucca Mountain Site Characterization Project from one that focused on essential basic scientific data collection to a project whose major emphasis is on key model validation, data synthesis and analysis. That suite of activities supports the continued refinement of engineering and designs for the waste package and repository that, in turn, are essential to the Program's ability to achieve key outyear milestones.

Figure 3 - Scientific experiments being conducted at the Thermal Testing Facility in the Exploratory Studies Facility.

Figure 3 shows the drift-scale thermal test, a major test to validate the Yucca Mountain repository and waste package performance models.

The planned and ongoing technical, scientific, and environmental documentation activities continue to be **critical** to the Program's ability to accomplish three of the most significant milestones since the Program's inception - issuance of the Final Environmental Impact Statement and accompanying Record of Decision in 2000; preparation and submission of the Site Recommendation to the President in 2001, should the Yucca Mountain site be found suitable for development as a repository; and the preparation and submission of the License Application, for repository construction, to the Nuclear Regulatory Commission in 2002.

Figure 4, shown on the next page, depicts the major outyear milestones and the decision process leading to the development of the repository. The decision process follows the fundamental requirements established by the Nuclear Waste Policy Act, as amended, and provisions contained in the FY 1997 Energy and Water Appropriations Act Activities planned to be carried out by OCRWM in FY 1999 are in direct support of key program milestones and decision documents that are scheduled for completion within the next several fiscal years.

This Program is a key component of a number of high-priority Departmental missions. A licensed, fully operational repository is essential to the Department's ability to fulfill its mission for the orderly disposition of fissile materials and the accelerated clean up of facilities that were part of the Cold War weapons complex.

With the planned completion of the viability assessment in late 1998, as directed by Congress in the FY 1997 Energy and Water Appropriations Act, the Program, in FY 1999, will focus principally on completion of the following critical activities: 1) issuance, for public review and comment, of the draft Environmental Impact Statement Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain. Issuance of the Draft EIS will support the issuance of the Final Environmental Impact Statement that is to accompany the Site Recommendation to the President that is scheduled for 2001; 2) completion of elements of the design of the Mined Geologic Disposal System to assess waste containment and isolation. This activity supports the Total System Performance Assessment for the License Application scheduled for 2002. This focused design effort will provide a more mature design that will enable us to understand and evaluate, through the total system performance assessment, the behavior of the repository in the geologic setting; and 3) completion of the last phase of a multi-year peer review of the Total System Performance Assessment component of the viability assessment. This activity, by providing confirmation and guidance for the next iteration of the total system performance assessment, supports the License Application process.

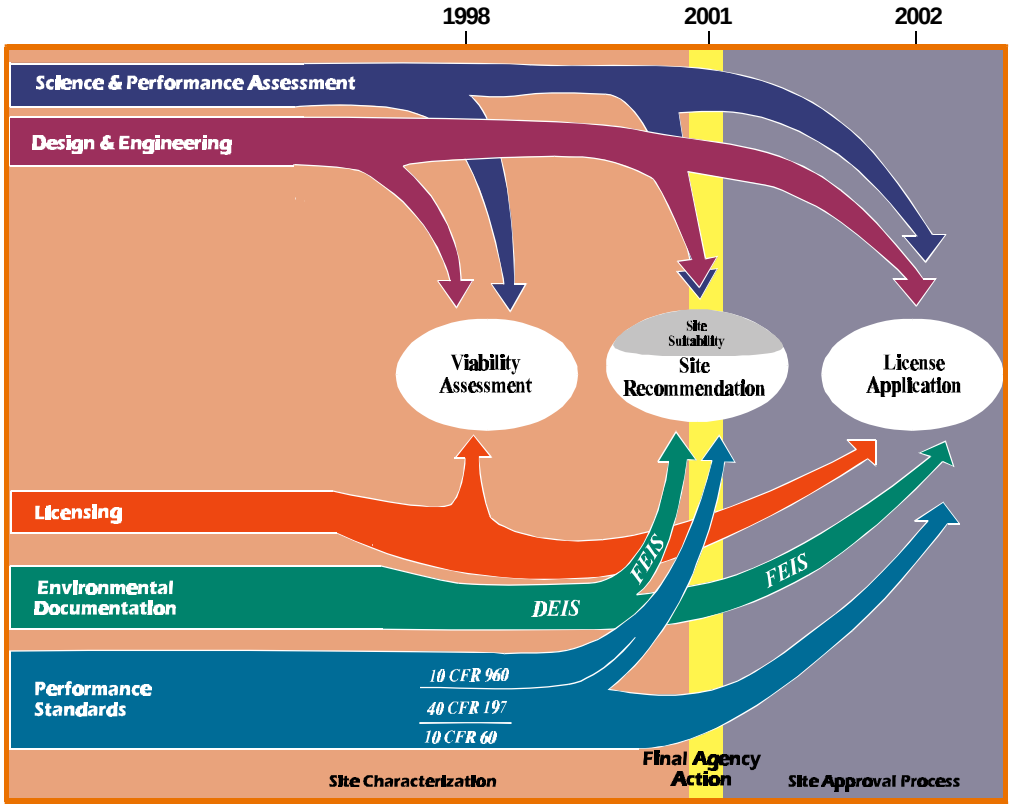

Figure 4 - Decision process leading to major programmatic milestones.

Within the area of responsibility of the Office of Waste Acceptance, Storage, and Transportation, the focus continues to be on remaining prepared to implement the long-lead time activities (e.g., the acquisition of equipment and transportation services and other early activities associated with the Department's waste acceptance obligation) that must precede the removal of spent nuclear fuel from reactor sites once a Federal facility becomes available. In addition, the Department intends to provide the private sector an incentive to stimulate the development and implementation of a multi-purpose canister system compatible with repository disposal requirements.

The Program continues to operate utilizing two Business Centers (Yucca Mountain Site Characterization Project and the Waste Acceptance, Storage, and Transportation Project) and a Management Center. The largest portion of the Program's funding is concentrated in the Yucca Mountain Business Center.

The OCRWM's FY 1999 budget request of $380 million supports the activities necessary for the continued implementation of the revised Program Plan.

CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM
FUNDING REQUIREMENTS
($ in 000's)

	FY 1997 Enacted Approp.*	FY 1998 Enacted Approp.*	FY 1999 Budget Request *	FY 2000 Budget Request*	FY 2001 Budget Request*
Yucca Mountain Site Characterization	299,459	267,710	297,823	287,328	270,186
Waste Acceptance, Storage & Trans.	9,360	5,947	10,505	9,130	21,855
Program Management Center	73,181	72,343	71,672	73,542	67,959
APPROPRIATIONS	**382,000**	**346,000**	**380,000**	**370,000**	**360,000**

* Funding for selected support service contracts have been removed from the YMP and OWAST centers, and added to the Program Direction element in the Program Management center.

Strategic Alignment Initiative

The Secretary's Strategic Alignment Initiative (SAI) established targets for reducing the number of Federal employees that are employed by the Department. To comply with the SAI, the Office of Civilian Radioactive Waste Management flattened the organizational structure. This has resulted in: improvement in the employee to supervisor ratio; placement of authority at organizational levels where the actual work tasks are managed; elimination of middle management positions; and transfer of full-time equivalent positions from headquarters in Washington D.C. to the Yucca Mountain Site Characterization Project in Las Vegas, Nevada. In addition, to meet the SAI targets and to address critical programmatic skill mix issues, the Program in FY 1998, initiated a reduction-in-force that led to the involuntary separation of 22 full-time equivalent positions.

The Office of Civilian Radioactive Waste Management staffing profile, which adheres to the SAI targets is displayed here in Federal Full Time Equivalent Employees (FTEs), not on board strength targets, and is as follows:

FEDERAL STAFFING PROFILES

PROGRAM DIRECTION:	**FY 1997**	**FY 1998**	**FY 1999**	**FY 2000**	**FY 2001**
HEADQUARTERS - OCRWM:					
Washington D.C.	103	79	65	57	56
Yucca Mtn Project Ofc	106	106	101	100	100
Subtotal	209	185	166	157	156
FIELD:					
Richland	1	0	0	0	0
Nevada	4	4	4	4	4
Subtotal	5	4	4	4	4
DOE MATRIX:	18	17	17	17	17
GRAND TOTAL	232 *	206	187	178	177

*** Actual FTE usage in FY 1997 was 225**

CONTRACTOR STAFFING PROFILE

Field Offices/ Sites		FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
Albuquerque Operations Office						
Los Alamos National Laboratory		64	84	70	74	67
Sandia National Laboratory		45	58	44	46	35
	SUBTOTAL, AL	109	142	114	120	102
Chicago Operations Office						
Argonne National Laboratory (East)		6	8	16	9	8
	SUBTOTAL, CH	6	8	16	9	8
Idaho Operations Office						
Idaho National Engineering Laboratory		10	10	10	10	10
	SUBTOTAL, ID	10	10	10	10	10
Oakland Operations Office						
Lawrence Berkeley National Laboratory		35	43	34	23	22
Lawrence Livermore National Laboratory		88	89	88	90	70
	SUBTOTAL, OAK	123	132	122	113	92
Oak Ridge Operations Office						
Oak Ridge National Laboratory		1	1	0	0	0
	SUBTOTAL, OR	1	1	0	0	0
Richland Operations Office						
Pacific Northwest National Laboratory		6	6	11	11	4
	SUBTOTAL, RL	6	6	11	11	4
TOTAL: Field Offices/ Sites		**255**	**299**	**273**	**263**	**216**
Headquarters						
Washington D.C.		243	228	243	235	235
Nevada, YMP		1,450	1,250	1,400	1,300	1,350
TOTAL: Headquarters		**1,693**	**1,478**	**1,643**	**1,535**	**1,585**
TOTAL: combined Headquarters & Field Offices/ Sites		**1,948**	**1,777**	**1,916**	**1,798**	**1,801**

Notes: a) Staffing levels do not reflect the impacts of a contract for transport casks and storage module production, and waste acceptance and transportation.

b) The increased Headquarters contractor levels for FYs 00 & 01 reflect an expected increase in OWAST activities.

FY 1999 PERFORMANCE MEASURES

Commitment:

Issue Draft Environmental Impact Statement

By July 30, 1999, to support the Site Recommendation, issue the draft Environmental Impact Statement for public review and comment, as required by the National Environmental Policy Act.

Complete Design for Total System Performance Assessment - License Application

By July 30, 1999, to support the total system performance assessment for the License Application, provide the design information on elements of the Mined Geologic Disposal System (MGDS) needed to assist in the assessment of the repository safety strategy.

Complete Peer Review of the Total System Performance Assessment Component of the Viability Assessment

By March 30, 1999, to support the License Application, complete the Peer Review of the Total System Performance Assessment component of the Viability Assessment.

Description:

If the Secretary of Energy determines that the Yucca Mountain site is suitable for development as a repository, the Secretary may then recommend that the President approve the site for repository development. Under the Nuclear Waste Policy Act, as amended, any such recommendation must be accompanied by a final Environmental Impact Statement. The National Environmental Policy Act requires the DOE to issue a draft Environmental Impact Statement for public and agency comment. The draft Environmental Impact Statement must be issued in FY 1999 to allow adequate time for preparation of the final Environmental Impact Statement which must accompany the Site Recommendation.

There are a number of elements of the repository and waste package design, important to safely contain and isolate waste, that have not been previously designed, nor reviewed and approved by the Nuclear Regulatory Commission. At the completion of the design supporting Total System Performance Assessment - License Application, a little over half of the design detail for these “first of a kind”

elements will be completed. Other aspects of the design, that are also important to safely contain and isolate waste, are more familiar to the Nuclear Regulatory Commission, which has previously licensed similar designs at many nuclear power plants. Design details for these elements will be approximately one third complete. Design for the remaining Mined Geologic Disposal System elements will be preliminary.

The design products will be documented by drawings, technical documents, system and subsystem descriptions, and operational descriptions of systems and components important to safety. Design of underground emplacement areas will continue to be refined with the addition of new data from testing programs. The design of the intra-state transportation system will be sufficiently complete to support the Environmental Impact Statement. DOE/Navy spent nuclear fuel and other DOE wastes will continue to be integrated into waste package, underground, and surface designs.

The performance assessment peer review will provide a formal, independent evaluation and critique of the Total System Performance Assessment component of the Viability Assessment, completed in FY 1998. The peer review report will provide confirmation and guidance for the next iteration of the Total System Performance Assessment for the License Application. A peer review panel of six experts, selected to address several technical areas important to the Total System Performance Assessment, was established in FY 1997, and is focusing on the total system performance assessment process. The peer review panel is giving feedback to the Project during the development of the Total System Performance Assessment for the Viability Assessment, providing an interactive and integrated review. This approach facilitates the Total System Performance Assessment review, and assures that process models reflecting site conditions and engineering/design options are being appropriately used and are technically defensible with appropriate traceability and transparency.

The peer review panel members are evaluating physical events and site processes considered in the total system performance analyses; the use of appropriate and relevant data; assumptions made; incorporation of process models into the total system models; application of analytical methods; traceability in analyses and conclusions; transparency in the evaluative process; and treatment of uncertainties. These aspects will be evaluated within the context of their significance to the long-term performance of a repository at Yucca Mountain.

Units of Measure:

Actual performance against this commitment will be compared at least monthly, against the OCRWM technical scope/cost/schedule baseline using the a Program's Planning and Control System.

Target Performance Level:

The Program will complete all three milestones by the dates documented in the Yucca Mountain Site Characterization Project Long Range Plan, and controlled in the Yucca Mountain Cost and Schedule Baseline, which leads to the Program's ultimate goal of repository operation in 2010.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
PROGRAM FUNDING PROFILE
(Tabular dollars in thousands)

PROGRAM ELEMENT	FY 1997 Enacted Approp.	FY 1998 Enacted Approp.	FY 1999 Budget Request	FY 2000 Budget Request	FY 2001 Budget Request
YUCCA MOUNTAIN SITE CHARAC.	$ 299,459	$ 267,710	$ 297,823	$ 287,328	$ 270,186
WASTE ACCEPT., STORAGE & TRANS	9,360	5,947	10,505	9,130	21,855
PROGRAM INTEGRATION:					
Quality Assurance	878	0 **a/**	0	0	0
Program Management	5,479	5,049	5,995	5,995	5,995
Human Resources & Administration	4,789	4,814	5,188	5,188	5,188
Total Program Integration	11,146	9,863	11,183	11,183	11,183
PROGRAM DIRECTION	62,035	62,480	60,489	62,359	56,776
TOTAL PROGRAM	**$ 382,000**	**$ 346,000**	**$ 380,000**	**$ 370,000**	**$ 360,000**
FUNDING:					
Nuclear Waste Disposal Fund	182,000	156,000	190,000	180,000	170,000
Defense Nuclear Waste Disposal Approp	200,000	190,000	190,000	190,000	190,000
TOTAL PROGRAM FUNDING	**$ 382,000**	**$ 346,000**	**$ 380,000**	**$ 370,000**	**$ 360,000**
STAFFING (FTEs)					
HQ FTEs (Washington and Nevada)	209	185	166	157	156
Field and DOE Matrix Support FTEs	23	21	21	21	21
TOTAL FTEs	**232 b/**	**206**	**187**	**178**	**177**

Authorizations: P.L. 97-425, "Nuclear Waste Policy Act" (1982); P.L. 100-203, "Nuclear Waste Policy Amendments Act" (1987)

a/ Starting in FY 1998, the Quality Assurance budget is included in the Program Direction account under support services.

b/ Actual FTE usage in FY 1997 was 225

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
PROJECTED RECEIPTS AND FUNDING BY FISCAL YEAR
(Dollars in thousands)

	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
One mill/kWh Fee 1/.....	595,903	601,663	625,272	632,221	637,229	641,141	651,500
One-time Fee.....	0	0	0	0	0	0	0
Subtotal.....	595,903	601,663	625,272	632,221	637,229	641,141	651,500
Investment 2/	471,970	450,450	506,710	567,880	632,690	702,690	777,820
Total Income.....	1,067,873	1,052,113	1,131,982	1,200,101	1,269,919	1,343,831	1,429,320
Program Funding:							
Nuclear Waste Disposal Fund	182,000	156,000	190,000	180,000	170,000	170,000	200,000
Defense Nuclear Waste Approp	200,000	190,000	190,000	190,000	190,000	190,000	190,000
Total, Program Funding	382,000	346,000	380,000	370,000	360,000	360,000	390,000

1/ Through 2002, based on January 1998, EIA forecast memo to OCRWM, thereafter, based on EIA "Nuclear Power Generation and Fuel Cycle Report 1996."

2/ Represents earnings on investments. Investment earnings through year 1997 are based on actual returns, later projections are based upon a 6.5% average rate of return.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
(Tabular dollars in thousands)
PROGRAM FUNDING BY SITE

LABORATORY/PLANT/INSTALLATION	FY 1997 Enacted Appropriation	FY 1998 Enacted Appropriation	FY 1999 Budget Request	FY 2000 Budget Request	FY 2001 Budget Request
Argonne National Laboratory	1,053	1,551	3,140	1,818	1,676
Chicago Operations Office	50	52	54	56	56
Lawrence Berkeley Lab	7,034	8,664	6,855	4,658	4,398
Lawrence Livermore National Lab	17,601	17,834	17,586	17,947	13,965
Los Alamos National Lab	12,897	16,791	13,983	14,899	13,312
Nevada Operations Office a/	39,351	38,305	45,771	45,112	39,655
Nevada Test Site	9,995	8,000	8,000	8,000	8,000
Nevada (Yucca Mountain Project Office) b/	216,207	194,692	221,829	214,783	207,132
Oak Ridge Institute for Science & Education	26	27	28	29	29
Oak Ridge National Laboratory	200	0	0	0	0
Oak Ridge Operations Office	244	407	264	275	275
Pacific Northwest Laboratory	1,215	1,142	2,253	2,157	839
Sandia National Laboratories	9,297	11,539	8,808	9,130	7,027
Washington Headquarters	66,830	46,996	51,429	51,136	63,636
TOTAL PROGRAM	$ 382,000	$ 346,000	$ 380,000	$ 370,000	$ 360,000

a/ Includes Financial Assistance to the State of Nevada, and Affected Units of Local Government and includes funding for contracts administered in Nevada (i.e. USGS, National Academy of Science, Universities, etc.)
b/ Includes funding disbursed to Nevada through a Headquarters administered contract (Management and Operating contractor, Support Services contracts, etc.)

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
NUCLEAR WASTE FUND
(Dollars in thousands)

YUCCA MOUNTAIN SITE CHARACTERIZATION

I. Mission Supporting Goals and Objectives

After the completion of the Viability Assessment in 1998, the objectives of the Yucca Mountain Site Characterization Program Element will be to: 1) complete a Draft Site Recommendation in FY 2000; 2) complete the final Environmental Impact Statement in FY 2000; 3) if the site is suitable for development as a repository, complete the Site Recommendation for the Secretary of Energy to submit to the President, accompanied by the final Environmental Impact Statement in FY 2001; and, 4) if the Site Recommendation is accepted by the President, complete the site characterization phase by submitting a License Application to the Nuclear Regulatory Commission in FY 2002.

In FY 1999, the Yucca Mountain Site Characterization Project will focus on the remaining statutory requirements of the Nuclear Waste Policy Act, as amended by completing and issuing the draft Environmental Impact Statement; developing a report demonstrating compliance with 10 CFR Part 960 in support of the Site Recommendation; preparing the Working Draft of the License Application; completing development of the electronic docketing system; conducting sensitivity analyses and confirming scientific, design, and total system performance assessment models for use in the License Application; and continuing with the integrated repository and waste package design to support preparation of the License Application and development of construction specifications.

The planned activities are in direct support of the key longer term programmatic milestones noted above. The Yucca Mountain Site Characterization Project will, in FY 1999, carry out a significant suite of activities to support the **Site Recommendation.** The Program will also issue the **Draft Environmental Impact Statement** for public comment. After the public comment period, this draft Environmental Impact Statement will be finalized for issuance in FY 2000 to support the Site Recommendation and the License Application. The Yucca Mountain Site Characterization Project will continue to refine the **repository and waste package designs** for the Site Recommendation and the License Application. In FY 1999, these design efforts will

support the assessment of waste containment and isolation for the **Total System Performance Assessment – License Application**. There will be continued **Core Science Activities** to acquire additional data that will enable the Project to confirm its understanding of the potential performance of the repository natural system as a barrier to radionuclide release.

Site Recommendation:

The Site Recommendation will be based on: (1) a description of the proposed repository, including preliminary engineering specifications; (2) a description of the waste, or packaging and an explanation of the relationship between the geologic environment and the waste packages and waste forms; (3) a discussion of data obtained during site characterization relating to the safety of the site; (4) the final Environmental Impact Statement; and (5) preliminary comments by the Nuclear Regulatory Commission concerning the extent to which the at-depth site characterization analyses and waste form proposal seem to be sufficient for inclusion in a license application.

One of the first steps in developing the Site Recommendation will be the completion of a compliance in FY 1999, to determine if the scientific analyses, testing, design, and modeling completed to date, during the site characterization phase, would comply with the repository siting guidelines codified in 10 CFR Part 960. This 10 CFR 960 compliance evaluation will also provide part of the preliminary basis for the draft Site Recommendation.

Environmental Impact Statement:

The Nuclear Waste Policy Act requires that an Environmental Impact Statement accompany the Site Recommendation and the License Application. We began the National Environmental Policy Act process in FY 1995 by publishing a Notice of Intent in the *Federal Register*, which initiated the public comment period on the proposed scope of the Environmental Impact Statement. As part of the scoping effort, we conducted 15 public meetings across the nation. Comments made at the scoping hearings were formally documented in a Comment Summary Document, issued in FY 1997.

The next major product of the National Environmental Policy Act process is the draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada. In FY 1999, we will complete the draft Environmental Impact Statement, and issue it for public review and comment. The public comment period is planned to continue into FY 2000.

Repository and Waste Package Design:

After completion of the viability assessment, repository and waste package design activities will continue in support of site recommendation, licensing, and construction. The repository and waste package designs will be heavily dependent upon, and closely integrated with the performance assessment modeling and Core Science data collection and testing activities. In FY 1999, the design will be used in developing the Total System Performance Assessment for the License Application. Integration with the Core Science activities will ensure that the designs are supported by the available scientific data. The repository and waste package designs will utilize information about the natural system, including structural, thermal, and hydrologic rock properties, as well as information on potential climate and seismic conditions.

Important areas of design emphasis will include: waste package materials, and waste form testing and analyses; waste handling system and emplacement operations; the repository concept of operations; demonstration of compliance with codes, standards, and regulatory requirements; detailed engineering for elements of the repository system that have not been licensed before; and assessment of design alternatives that bound potential environmental impacts. The design for License Application will be supported by safety and accident analyses, and will describe designs in sufficient detail to demonstrate the repository safety case.

Early in FY 1999 we will complete the Disposal Criticality Analysis Methodology Topical Report and provide it to the Nuclear Regulatory Commission for their formal review. Using data generated by the ongoing waste package materials and waste form testing, we will update the Waste Form Characteristics Report and Engineered Materials Characterization Report. Information collected from the smaller heater test completed in FY 1997 and the ongoing drift scale heater test, will support a decision on the design basis repository thermal load.

Other waste forms, including DOE spent nuclear fuel, Navy fuel, and immobilized plutonium will be incorporated into the repository design. Disposal interface specifications will be developed for these waste forms. Special studies will be conducted on some of the unique aspects of these waste forms and their containers.

Total System Performance Assessment:

A major focus of modeling activities in FY 1999 will be on the use of the latest test results to refine models of processes (such as moisture flow and transport) in the natural, geologic system as well as in the engineered system (consisting of the repository and the emplaced waste packages). Results from these updated process models will be used to calibrate, refine, and ultimately reduce uncertainty in the total system performance models that will support the License Application. Total system performance assessment models are based on an abstraction of the more detailed models of the natural system, and repository and waste package designs. We will conduct sensitivity analyses to determine which model parameters and assumptions may have the greatest influence on total system performance.

In addition to the design descriptions, the Total System Performance Assessment for the License Application requires waste package materials corrosion models and waste form degradation models to permit calculation of waste package lifetime and potential radionuclide releases. These mechanistic process models will describe approximately twenty different materials and waste form degradation modes. The preliminary models available by the end of FY 1998 will be refined in subsequent years as more test data is generated from ongoing materials and waste form tests. Relatively mature models will be available to support the Total System Performance Assessment for the License Application.

To describe and predict the performance of the natural system as a barrier, the natural system models will be evaluated to assure they are sufficiently mature to support the analyses in the License Application. These models are based on scientific data and testing, and represent natural processes in the potential repository. These include models of: 1) heating and moisture flow in the area immediately adjacent to the emplaced waste packages (near field environment); 2) both moisture flow and potential radionuclide transport in the unsaturated zone (beneath the repository horizon where waste will be emplaced); and 3) both flow and transport in the saturated zone (the area beneath the unsaturated zone).

The Peer Review of the Total System Performance Assessment component of the Viability Assessment will complete a formal, independent evaluation and critique that started in FY 1997. The peer review report will provide confirmation and guidance for the next iteration of the Total System Performance Assessment that will be included in the License Application.

Core Science:

Underground tests in the Cross Drift (that generally runs from the northeast to the southwest and will be excavated in FY 1998) will support the enhanced characterization of the repository block. Additional testing to provide confirmatory data on the characterization of the geologic unit below the repository block will be undertaken in FY 1999, to support the License Application. Two current project principles require the Program to perform additional *in-situ* testing in FY 1999. These principles are: 1) "Defense in Depth", and 2) Repository Safety Strategy. This *in-situ* testing will be accomplished in the unsaturated zone test facility constructed in FY 1999. Data collected through this additional testing will increase our understanding of the hydrology, geology, and geochemistry of this geologic unit underlying the proposed repository horizon.

FY 1999 will bring to a close our initial tests in the two Ghost Dance Fault alcoves off the main Exploratory Studies Facility tunnel. These tests will provide information on the potential for the Ghost Dance Fault to act as a pathway for radionuclide release. The multi-year heat up phase for the Drift Scale Heater Test in the Thermal Testing alcove, also located off the main tunnel, will continue. The Drift Scale Heater Test is a large scale, long duration test needed to supply information on how thermal, hydrologic, chemical, and mechanical processes all simultaneously interact with each other. The Drift Scale Heater Test will also verify the near field environment (the area closest to the emplaced waste packages) and confirm our understanding of the processes that can transport radionuclides. In addition, further testing both from the surface and underground will be initiated for performance confirmation.

Budget Structure:

The Program sub-elements are: Operations/Construction; Core Science; Design and Engineering; Suitability and Licensing & Performance Assessment; National Environmental Policy Act (NEPA); Project Management; and External Oversight and Payments-Equal-to-Taxes. The multi-year scope of these functions is described below:

Operations/Construction:

Operations and Construction includes planning and coordination of underground excavation, operations, and maintenance of the Exploratory Studies Facility, including the five mile loop and the nine testing areas (alcoves and niches off the main loop). Excavation equipment used includes the 25 foot diameter Tunnel Boring Machine through FY 1997; a smaller diameter Tunnel

Boring Machine in FY 1998; and in FY 1999, mechanical equipment to construct alcoves and niches in the Cross Drift. These alcoves and niches will be used for scientific testing to enhance characterization of the repository block; and maintenance to support acquisition of test data for the Viability Assessment, Environmental Impact Statement, Site Recommendation, and License Application. Out-year operations and construction will continue to include general test support and upgrading of the major Exploratory Studies Facility systems to provide and maintain a fully functional scientific research facility. Safety and health programs, to assure the protection of employees and members of the public, will continue as will field support services provided by the Nevada Test Site.

Core Science:

Core Science includes collection of site characterization and performance confirmation data from the surface and subsurface, and testing in the laboratory; environmental data collection, monitoring, and requirements compliance; site and materials performance testing; scientific test planning and design; formulation of scientific hypotheses, modeling and hypothesis testing; development of scientific information for technical data bases; and completion of models and synthesis reports that serve as the basis for scientific descriptions and analyses used in the documentation supporting major program milestones, including the Viability Assessment, Environmental Impact Statement, Site Recommendation, and License Application.

Design and Engineering:

Design and Engineering activities consist of three major areas of work: Systems Engineering, Waste Package, and Repository. These three areas of work are integrated to develop the Mined Geologic Disposal System (MGDS) design, including the supporting technical data, design models, and design analyses. The Systems Engineering area of work includes the development and maintenance of Project Management controls documentation, MGDS design requirements and criteria, integrated engineering systems studies, and integration of MGDS engineering and design work, as well as total system life cycle cost documentation.

The Waste Package area of work includes interfaces with Systems Engineering, waste package thermal, structural, nuclear, and materials selection analyses, waste package fabrication and closure weld development, design drawings and specifications development, waste package support system design, waste package materials performance testing and modeling, and waste form performance testing and modeling.

The Repository area of work includes interfaces with Systems Engineering, underground access and emplacement drift design, in-drift ground support and invert development and testing, and ventilation system design, as well as waste package transport, emplacement, and retrieval design. The Repository area of work also includes the surface facility designs for the receipt and handling of transport casks, waste handling and packaging, secondary waste treatment, transport rail spur siting and design, and other auxiliary facilities.

Performance Assessment:

This activity is combined with the Suitability and Licensing function described below. After the Viability Assessment, performance assessment is an integral part of the work to prepare a Site Recommendation and a License Application.

Suitability and Licensing & Performance Assessment:

Suitability and Licensing activities include the development of a preliminary basis to support a Site Recommendation in FY 2000, based on inputs from Core Science, Design and Engineering, and the results of Total System Performance Assessments. If the site is suitable, the Secretary will issue the Site Recommendation to the President in FY 2001.

The objective of the licensing program is to prepare a License Application for repository construction for submittal to the Nuclear Regulatory Commission. Prior to submittal of the License Application, the objective is to address and resolve procedural and technical issues and facilitate the licensing process, by coordinating and participating in pre-licensing interactions with the Nuclear Regulatory Commission. The interactions with the Nuclear Regulatory Commission are planned to lead to agreement on the content and level of detail that will be included in the License Application so that the Nuclear Regulatory Commission will be able to accept it for review upon submittal in FY 2002, and, if warranted, grant a construction authorization after the three-year review period mandated by the Nuclear Waste Policy Act, as amended. This budget sub-element includes interactions with the Nuclear Regulatory Commission, Nuclear Waste Technical Review Board, and other external organizations. It also includes the management and control of technical databases and the program records that are critical to support preparation of the Viability Assessment, Environmental Impact Statement, Site Recommendation, License Application, and the licensing process.

Performance assessments are important to the evaluation of site suitability and to the preparation of the Site Recommendation. Performance assessments are needed to quantitatively evaluate the ability of the natural system and engineered barriers to meet preclosure and postclosure performance objectives. Performance assessments are conducted by making calculations and evaluating the adequacy of the models' prediction of physical processes to provide information on the performance of the total repository system in both the preclosure and postclosure periods. Performance assessments are used to evaluate the significance of physical processes and parameters that affect potential migration of radionuclides to the accessible environment.

Under the Nuclear Waste Policy Act of 1982, as amended, the Department of Energy is required to issue general guidelines for the recommendation of sites for repositories. These guidelines, at 10 CFR Part 960, reflect a phased process of screening and selecting sites culminating in a determination by the Department of Energy of whether sites are suitable for development as a repository. A suitable site could be recommended to the President and then Congress. If the site is approved by Congress the Department of Energy must submit a license application to the Nuclear Regulatory Commission that will be evaluated under the requirements of 10 CFR Part 60, which is the primary regulation for licensing deep geologic repositories. This regulation, required by the NWPA, implements the Environmental Protection Agency's health and safety standards for geologic repositories and sets forth the technical requirements and criteria for approving or disapproving repository license applications.

The identification and traceability of technical data is mandated by 10 CFR Part 60, Subpart B, and the Department of Energy and Nuclear Regulatory Commission Procedural Agreements. Activities associated with data and records management are essential to License Application development and the Nuclear Regulatory Commission license review process, to ensure the traceability and retrievability of all technical data used in developing the repository design, and other inputs to the total system performance assessment, and in developing models for site processes and conditions. These records and databases also support preparation of the Environmental Impact Statement and Site Recommendation and ensure support for the complete record of these activities. The Program will take full advantage of the emerging web-based technology.

NEPA:

National Environmental Policy Act compliance activities include the conduct of scoping meetings; reviewing and responding to public scoping comments; data gathering and impact analyses and consultations with other agencies and Native American Indian tribes. All of these activities will lead to development and issuance of a draft Environmental Impact Statement for public comment. A final Environmental Impact Statement as well as a Record of Decision, embracing the same process of analysis and consultation described above, will be developed following the public comment period. The draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-level Radioactive Waste at Yucca Mountain will be issued in FY 1999 and the Environmental Impact Statement and Record of Decision will be issued in FY 2000. NEPA data needs will be satisfied by data from Core Science, Suitability and Licensing, and Design and Engineering.

Project Management:

Project Management includes planning, budgeting, and scheduling of all the Yucca Mountain Site Characterization Program element activities, facilities and property, site security, telecommunications and rents; records management, procurement, and maintenance and operation of wide/local area networks and computing facilities, in concert with the program-wide information architecture; and motor pool operations. The major components of these activities are: management and integration functions for all approved work, program element control performance measurement system, technical program element management staff, and cost and schedule baseline management. Project management also includes conduct of public information and outreach programs to ensure that open and informative interactions with the public and program element stakeholders are provided.

External Oversight and Payments-Equal-To-Taxes (PETT):

External Oversight consists of financial and technical assistance to the State of Nevada and Affected Units of Local Government. Payments-Equal-To-Taxes includes sales and use tax, and business tax to the State of Nevada, and property tax to Nye County, Clark County, Esmeralda County, Lincoln County and Inyo County.

II. Funding

Program Activity	FY 1997	FY 1998	FY 1999	Change	% Change	FY 2000	FY 2001
Operations/Construction	90,611	47,814	69,000	21,186	44.31%	44,300	45,000
Core Science	73,076	73,669	70,000	(3,669)	-4.98%	61,500	61,500
Design & Engineering	70,028	62,888	78,697	15,809	25.14%	79,047	82,547
Performance Assessment	20,763	26,463	0	(26,463)	-100.00%	0	0
Suitability/Licensing	2,420	4,680	31,000	26,320	562.39%	29,000	29,000
NEPA	1,524	4,254	2,262	(1,992)	-46.83%	2,417	1,775
Project Management	34,037	36,042	28,864	(7,178)	-19.92%	53,064	32,364
External Oversight & PETT *	7,000	11,900	18,000	6,100	51.26%	18,000	18,000
TOTAL YMSCO	**299,459**	**267,710**	**297,823**	**30,113**	**11.25%**	**287,328**	**270,186**

NOTE: (1) Partial funding for the Quality Assurance (QA) program is included in the Design and Engineering program activity. The supporting QA narrative is located in the Program Integration section.

* FY 1998 PETT $6.9M; FY 1999 PETT $5.6M; FY 2000 PETT $5.6M; FY 2001 PETT $5.6M

III. Performance Summary

	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
OPERATIONS/CONSTRUCTION					
• **Exploratory Studies Facility Operations and Maintenance**	**18,000**	**15,000**	**18,000**	**22,300**	**23,000**

Exploratory Studies Facility Operations and Maintenance maintains the Exploratory

III. Performance Summary | **FY 1997** | **FY 1998** | **FY 1999** | **FY 2000** | **FY 2001**

Studies Facility to support scientific testing while ensuring the safety of test personnel and visitors, and to provide for a phased turnover of the constructed facility to site characterization operations.

The cost for FY 1998 operations and maintenance is expected to be lower than that experienced in FY 1997 due to a reduction in the amount and type of construction equipment necessary to excavate the planned test areas; the smaller cross drift size compared to the Exploratory Studies Facility main loop; and reduced construction requirements between the cross drift and main loop which in turn reduces equipment necessary for material handling. Operations and maintenance costs are expected to go up in the out-years as Exploratory Studies Facility and Enhanced Characterization of Repository Block facilities are prepared for or transitioned to a fully operational site characterization facility.

Exploratory Studies Facility operations and maintenance completed in FY 1997 or planned for FY 1998 through FY 2001 include:

- Maintain Exploratory Studies Facility facilities and utility systems consistent with testing and institutional program requirements. Facilities and systems include roads, pad building and structures, underground power, water distribution, ventilation, ground support, communications, fire suppression, lighting, and security. Facilities and site maintenance are long duration tasks that span site characterization and increase in the out-years.
- Acquire and install data acquisition system for the Exploratory Studies Facility drift heater test and other main loop test locations. The data acquisition system for the Drift Scale Heater Test was procured in FY 1997. Installation will be completed in FY 1998. The data acquisition system for the remainder of the Exploratory Studies Facility main loop will be procured and installed in FY 1998 through FY 1999.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
- Maintain heavy construction equipment consistent with planned work and occupational safety and health requirements. Equipment maintenance is a long duration task that spans construction and site characterization. - Provide support services such as trash and refuse management, janitorial, drinking water, sanitation, vehicle fueling, access control and underground transportation. Support services are long duration tasks that span site characterization. - Rent, lease, or acquire common use construction equipment and storage units from the Nevada Test Site or outside sources. This task is linked to construction equipment maintenance and is expected to decrease in the out-years. - Provide general operations support for test setup and general services, such as drinking water, sanitary facilities, and underground transportation. Test support services are long duration tasks that span site characterization. Costs are expected to decrease as testing decreases. - Provide warehousing and handling of material and equipment replacement parts. Material handling is a long duration task that will span site characterization.					
• **Exploratory Studies Facility Main Loop and Other Construction**	**54,911**	**6,114**	**20,000**	**7,000**	**7,000**

The Exploratory Studies Facility loop with associated test facilities allows continued testing and evaluation of the geology and hydrology of the eastern portion of the proposed repository. The Busted Butte test facility is required to perform Core Science data collection and long duration testing of hydraulic flow and radionuclide sorption in support of the Site Recommendation and License Application. Alcoves and niches are required to perform Core Science data collection and long duration testing for performance confirmation in support of the Viability Assessment, Site Recommendation, and License Application.

Information gained from the Exploratory Studies Facility construction will be used to

determine the most efficient tunnel boring machine configuration and establish a predictive performance base for excavation of the perimeter and emplacement drifts. In addition, the construction information will be used to help determine the layout of the emplacement drifts and ventilation shafts. There are 25 major systems in the Exploratory Studies Facility main loop and surface support facilities, which have to be maintained to support construction and testing operations. Many of these major construction support systems will require upgrading to facilitate a transition to a fully operational site characterization facility. Some of these construction support systems include the north portal drainage, lighting, communication, additional ground support, electrical distribution, water distribution, waste water ventilation, and air distribution. An increase in construction costs is planned in FY 1999 to permit installation of required upgrades. Construction costs are expected to decrease after FY 1999 with only a limited number of new facilities required for Core Science data collection.

Exploratory Studies Facility main loop products and other construction activities completed in FY 1997 included:

- Completed excavation of the 7,877-meter long Exploratory Studies Facility main loop.
- Completed excavation and test setup of alcove 5, alcove 6, niche 1 and niche 2.
- Performed Title III inspection and facility completion tasks.
- Demobilized the 25 foot tunnel boring machine.
- Installed construction support facilities, such as a change house, maintenance shops, and Exploratory Studies Facility pad offices.
- Initiated construction support for the setup of the Drift Scale Heater Test. The majority of this work was completed in FY 1997 with the remainder planned for FY 1998.
- Provided construction support for test area modifications and upgrades.
- Provided construction support for test setup and general services, such as drinking

water, sanitary facilities, and underground transportation of scientific equipment.
- Provided general utilities to test locations.
- Acquired and initiated installation of a data acquisition system for the Exploratory Studies Facility Drift Scale Heater Test.

Exploratory Studies Facility main loop products planned for FY 1998 through FY 2001 include:
- Complete construction of alcoves and niches. This task includes completion of excavation and test facility setup of alcove 7 and niches 3 and 4. Construction of these niche test facilities is planned for FY 1998.
- Maintain and/or upgrade major construction support systems and components of the Exploratory Studies Facility main loop, alcoves, niches, and the cross drift consistent with testing and institutional program requirements. This is a long duration task that spans site characterization. The majority of the upgrades are planned for FY 1999.
- Surface the South Portal access road. Surfacing the south portal road is planned for FY 1998.
- Continue construction support for the setup and initiation of the Drift Scale Heater Test in FY 1998.
- Complete flow through ventilation system. Construction of the bulkheads and establishment of the flow through ventilation system are planned for FY 1998.
- Provide test area modifications and upgrades. This is a long duration task that will span site characterization.
- Provide construction support for test setup and general services, such as drinking water, sanitary facilities, and underground transportation. This is a long duration task that spans site characterization.
- Provide general utilities to test locations. This is a long duration task that will span site characterization.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
- Perform additional limited excavation for test support and provide support for test fabrication. This is a long duration task that will span site characterization. - Construct an unsaturated zone test facility and provide support for test setup and initiation in FY 1999. The unsaturated zone test facility will provide areas for core science data collection of major geologic structures and radionuclide transport in the unsaturated zone below the repository block. - Develop Southern Tracer Test Facility. Construction activities for the Busted Butte test facility planned for FY 1998 and FY 1999 include: - Improve access road to the construction location. - Construct pad and portal area. - Construct access drift and test areas. - Provide construction support for test setup and initiation of Phase I and II testing in FY 1998. - Provide construction support for test setup and initiation of Phase III testing in FY 1999. - Install temporary utilities and support systems such as ventilation, ground support, water, power, sanitary facilities, lighting, and security. Construction support to be provided to the drilling of the surface boreholes SD-6 and WT-24 in FY 1997 through FY 1998 includes: - Construct drill pads and access roads. - Provide support utilities for drilling operations. - Continue drilling support for hydrologic and geologic testing.					
• **Enhanced Characterization of the Repository Block**	**3,500**	**12,400**	**16,000**	**0**	**0**

III. Performance Summary

	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001

This Enhanced Characterization of the Repository Block enables collection of scientific data during tunnel excavation, from additional underground tests in alcoves and niches, and additional boreholes drilled from the surface. This includes both surface and subsurface construction and testing programs established to enhance our knowledge of the entire repository block region including the western boundary. The cross drift will start in the Exploratory Studies Facility north ramp and proceed generally southwest. This tunnel is above the existing repository horizon.

Activities associated with the Enhanced Characterization of the Repository Block subsurface construction completed in FY 1997 included:

- Design and plan the cross drift and underground test facilities. Planning and designing will begin in FY 1997 and continue into FY 1998.

Activities associated with the Enhanced Characterization of the Repository Block subsurface construction for FY 1998 through FY 1999 include:

- Design and plan the cross drift and underground test facilities. Planning and designing will begin in FY 1997 and continue into FY 1998.
- Excavate the launch chamber and cross drift with a five-meter tunnel boring machine to approximately station 28+15 meters. Construction of the cross drift is planned for FY 1998.
- Mobilize the tunnel boring machine and at the completion of the cross drift excavation, disposition the tunnel boring machine. Mobilization and disposition are planned for FY 1998 and FY 1999.
- Install temporary utilities and support systems such as ventilation, ground support, water, power, material handling, communications, fire suppression, lighting, and security. Installation of temporary utilities is planned for FY 1998 and FY 1999.
- Complete excavation of five test areas (three alcoves and two niches). Construction of the cross drift test facilities is planned for FY 1999.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001

- Provide utilities to test locations. This is a long duration task that will span from initial construction through test setup.
- Provide support for test setup and general services, such as drinking water, sanitary facilities, and underground transportation. This is a long duration task that will span from initial construction through FY 1999.
- Perform additional limited excavation for test support and provide support for test fabrication. This is a long duration task that will span from initial construction through test setup.
- Provide Title III inspection. Title III inspection occurs during construction and test setup which is planned for FY 1998 and FY 1999.
- Provide construction support for the cross drift heater test setup and initiation. Construction of the cross drift heater test is planned for FY 1999.

The Enhanced Characterization of the Repository Block includes completion of boreholes (SD-11 and SD-13) which are located southwest and north of the proposed repository block and are not considered as part of the Exploratory Studies Facility. Associated surface construction activities planned in FY 1998 through FY 1999 include:

- Construct drill pads and access roads for surface boreholes SD-11 and SD-13.
- Provide support utilities for drilling operations.
- Provide support for hydrologic and geologic testing.

• **Field Support and Logistics**	**11,600**	**11,600**	**12,000**	**12,000**	**12,000**

Field support and logistics are needed for continued institutional programs and facility operations that are necessary to perform Core Science data collection and performance confirmation which forms the scientific basis for the Viability Assessment, Site Recommendation, and the License Application.

From FY 1997 through FY 2001, support will be provided for infrastructure for testing

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001

and construction work activities, which include:

- Maintain and upgrade Nevada Test Site facilities and utility systems consistent with testing and institutional program requirements. Facilities and systems include site roads, central support area building and structures, power and heating fuel distribution, water distribution, and sewage systems. General infrastructure support is a long duration task and spans site characterization.
- Provide contracted bus services for site workers.
- Provide site management.
- Maintain light duty fleet equipment consistent with planned work. General infrastructure support is a long duration task and spans site characterization.
- Provide such services as trash and refuse management, and janitorial services.
- Provide visitor logistics through site access control, badging, security, and escorts.
- Provide telecommunication support including pagers, radios, and telephones.
- Perform and coordinate occurrence reporting and emergency management.
- Conduct studies of existing electrical power structures and supporting systems to meet future requirements. Also, increase the capacity of power transmission lines and review the studies to determine power supply stability.

• **Environmental Safety, and Health**	**2,600**	**2,700**	**3,000**	**3,000**	**3,000**

Environmental Safety, and Health mitigate any potential hazards during testing, construction and operations. They are necessary to continue Core Science data collection and performance confirmation that forms the scientific basis for the Viability Assessment, Site Recommendation, and the License Application.

Environmental Safety and Health activities completed in FY 1997 included:

- Operated hazardous waste accumulation facilities.
- Managed programs to mitigate any potential hydrocarbon contamination of the soil.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001

- Conducted surveillances of site activities to ensure compliance with environmental regulations.
- Ensured the protection of employees, members of the public, environment, and site workers from hazards that may result from site characterization activities.
- Monitored Exploratory Studies Facility conditions for occupational health compliance with ventilation and air quality requirements for dust abatement.
- Began modification and development of administrative controls for the Area 25 sewage lagoon to meet the State of Nevada permit requirements.

- Maintained medical emergency services, emergency management programs, fire prevention programs to support field activities, and safety and health programs complying with applicable requirements.

Environmental Safety and Health activities planned for FY 1998 through FY 2001 include:

- Operate hazardous waste accumulation facilities.
- Manage programs to mitigate any potential hydrocarbon contamination of the soil.
- Conduct surveillances of site activities to ensure compliance with environmental regulations.
- Ensure the protection of employees, members of the public, environment, and site workers from hazards that may result from site characterization activities.
- Monitor Exploratory Studies Facility conditions for occupational health compliance with ventilation and air quality requirements for dust abatement.
- Complete modification and/or develop administrative controls for the Area 25 sewage lagoon to meet the State of Nevada permit requirements.
- Maintain medical emergency services, emergency management programs, fire prevention programs to support field activities, and safety and health programs complying with applicable requirements. These activities will continue through

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
repository licensing, construction, operations, and closure.					
TOTAL OPERATIONS/CONSTRUCTION:	**90,611**	**47,814**	**69,000**	**44,300**	**45,000**
CORE SCIENCE:					
• **Surface-Based Testing**	**10,800**	**13,000**	**10,000**	**9,700**	**9,700**

Surface based testing activities collect and analyze data from hydrologic, geologic, and geochemical surface based studies to understand the natural processes under ambient conditions. Surface based testing is performed primarily in boreholes. Core Science data collection and long duration testing for performance confirmation form the scientific basis for the Viability Assessment, Site Recommendation, and the License Application.

Surface based testing peaks in FY 1998 with the completion of construction of surface borehole SD-6 and testing in boreholes WT-24 and SD-6. Surface based testing is expected to level out in the out-years as hydrologic monitoring continues for an extended period of time.

Surface based testing activities completed in FY 1997 included:

- Initiated water testing in borehole WT-24. The purpose of this borehole is to conduct aquifer tests to characterize site hydraulic properties, evaluate the large hydraulic gradient, and provide input into the regional saturated zone hydrologic model.

- Conducted a Probabilistic Seismic Hazards Assessment to complete the evaluation of potential hazard to the site from seismic activity and to support production of

seismic design parameters for facilities to be constructed at Yucca Mountain. This is to be finalized in 1998.
- Continued tracer testing in C-well complex to evaluate radionuclide transport in the saturated zone.
- Assembled and summarized the natural resources data. The results are to be used in human intrusion scenario calculation for the Total System Performance Assessment.

Surface based testing activities planned for FY 1998 through FY 2001 include:
- Initiate and conduct the second tracer complex test on saturated flow characterization and transport of radionuclides.
- Complete testing and data analysis at the second tracer complex for utilization and confirmation of saturated zone hydrologic and transport models.
- Continue hydrologic testing on surface borehole WT-24.
- Continue tracer test in C-well complex.
- Complete geologic testing on surface borehole SD-6.
- Collect structural and stratigraphic data on boreholes WT-24 and SD-6 to confirm rock properties model, the integrated site (geologic) model and support refinement and confirmation of the unsaturated and saturated-zone flow models.
- Continue hydrologic testing and water table monitoring in three boreholes drilled adjacent to the west, southwest, and north edge of the proposed repository block, to reduce uncertainty in the geologic and hydrologic models.
- Continue hydrologic testing of other water table boreholes.
- Continue hydrologic testing and continue water table monitoring to address uncertainty concerning the steep hydraulic gradient north of the repository block.
- Prepare reports documenting data and analyses.
- Modify and update the three dimensional model-data base with the new surface and

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
subsurface geologic and mineralogic data. - Evaluate variations from predictions used to update the geologic framework.					
• **Exploratory Studies Facility Testing and Other Subsurface Testing**	**18,000**	**14,000**	**10,000**	**9,700**	**9,700**

Exploratory Studies Facility testing and other subsurface testing activities collect and analyze data from hydrologic, geologic, geochemical, and geomechanical studies to understand the natural processes of rock mechanics and moisture migration under ambient and elevated temperature conditions. Subsurface testing is performed in the Exploratory Studies Facility main loop, alcoves, and niches and in the Busted Butte test facility. Data collection and long duration testing for performance confirmation forms the scientific basis for the Viability Assessment, Site Recommendation, and the License Application.

Data collection will include hydrologic data, geotechnical data, analysis of fracture-filling minerals, and chlorine-36. These early observational data are used for the confirmation of related concepts contributing to the Viability Assessment, and they provide input to program elements such as the unsaturated zone flow models.

Subsurface testing cost for FY 1997 through FY 2001 peaked in FY 1997 which included the completion of construction and continuation of testing in the Exploratory Studies Facility main loop, alcoves, and niches. The Busted Butte test facility will address unsaturated zone transport and radionuclide sorption. Initiation of Busted Butte testing is planned for FY 1998 and will continue through FY 2001. Exploratory Studies Facility hydrologic niches 3 and 4 will be constructed and testing initiated in FY 1998. Exploratory Studies Facility and other subsurface testing is expected to level off in the out-years as testing and data analysis continues for an extended period of time.

III. Performance Summary **FY 1997** **FY 1998** **FY 1999** **FY 2000** **FY 2001**

Subsurface data collection and testing activities completed in FY 1997 included:

- Completed geologic mapping and sampling of the Exploratory Studies Facility tunnel and alcoves.
- Initiated subsurface borehole testing of hydrologic features such as contacts between geologic units, that may influence flow paths through the repository block.
- Initiated hydrologic testing in Exploratory Studies Facility test area (niches) and drift closure studies.
- Initiated testing in the North Ghost Dance Fault alcove.
- Initiated preparation of the Southern Ghost Dance Fault alcove for hydrologic testing.

Subsurface data collection and testing activities planned for FY 1998 through FY 2001 include:

- Complete analysis of composition and age of secondary minerals sampled in the tunnel walls and borehole core and estimate past percolation flux from this testing.
- Complete seismic investigations of the repository block, using borehole and drift access for mapping of fracture properties.
- Complete borehole testing of hydrologic features such as contacts between geologic units which may influence flow paths through the repository block.
- Monitor responses to excavation and verify models of rock mass response to repository construction.
- Complete report preparation and data analyses of hydrologic testing initiated in FY 1998.
- Complete hydrologic testing in alcove 2, alcove 3, and alcove 4.
- Enhance alcove 2 to permit utilization as a visitor center to support institutional programs. The modification of alcove 2 is planned for FY 1998.
- Complete geological, geochemical, and hydrologic testing and sampling in the

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001

geologic unit below the proposed repository.
- Conduct hydrologic testing in the South Ghost Dance Fault alcove.
- Complete testing in the North Ghost Dance Fault alcove.
- Analyze additional water and mineral samples for isotopic tracers to constrain and evaluate flow models for the site.
- Collect data from selected natural analogues to strengthen the flow and transport database.
- Complete field-scale unsaturated-zone radionuclide transport test in the Busted Butte test facility.

• **Enhanced Characterization of Repository Block Testing**	**0**	**4,000**	**11,000**	**4,000**	**4,000**

Enhanced Characterization of the Repository Block testing will collect and analyze data from hydrologic, geologic, geochemical, and geomechanical studies conducted in the Exploratory Studies Facility, including the Cross Drift and surface based boreholes associated with the Enhanced Characterization of the Repository Block program, to understand the natural processes of rock mechanics and moisture migration under ambient and elevated temperature conditions. The Enhanced Characterization of Repository Block is an integrated construction and testing program established to enhance our understanding of site processes and reduce uncertainties about site suitability and repository construction. The Enhanced Characterization of Repository Block has an underground component, which is comprised of a cross drift, alcoves, and niches and a surface component that is comprised of two surface boreholes.

Enhanced Characterization of Repository Block testing peaks in FY 1999 with the completion of construction of the cross drift, alcoves, and surface boreholes and escalation of testing in these facilities or areas. Installation of test support systems and long term testing in the cross drift alcoves will be initiated in FY 1999.

III. Performance Summary **FY 1997** **FY 1998** **FY 1999** **FY 2000** **FY 2001**

Surface based testing activities planned for FY 1998 through FY 2001 include:

- Complete testing in two boreholes, SD-11 and SD-13, drilled to the southwest and north edge of the proposed repository block and acquire geophysical logs. Collect structural and stratigraphic data from the new holes SD-11 and SD-13 to confirm rock properties model, the integrated site (geologic) model, and support refinement and confirmation of the unsaturated and saturated-zone flow models.

Subsurface testing activities planned for FY 1998 through FY 2001 include:

- Complete testing of the Solitario Canyon Fault and studies to evaluate the importance of this fault to waste isolation and performance.
- Complete seismic investigations of the repository block, using borehole and drift access for mapping of fracture properties.
- Complete investigations of spatial variability of thermal and geomechanical properties in the additional tunnel, and publish reports.
- Analyze samples of rock and fracture minerals from the cross drift, including analysis of environmental isotopes and fracture mineralogy, and analysis of pore water chemistry to assess how percolation flux conditions vary across the repository block and evaluate the impact of variations in surface infiltration.
- Continue geochemical and hydrologic investigations in the cross drift and testing areas excavated in FY 1998 and FY 1999.
- Conduct field and laboratory tests on samples of rock and water from subsurface boreholes.
- Prepare reports documenting data and analyses.
- Collect scientific data to evaluate variations from predictions used to update the geologic framework.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
• **Thermal Testing**	**12,600**	**6,500**	**6,000**	**5,500**	**5,500**

Thermal testing activities collect and analyze data to understand the response of the rock mass to coupled thermal-mechanical-hydrological-chemical process anticipated for the proposed repository. Heater tests provide scientists with an opportunity to study how properties of the host rock change during the heating and cooling cycle expected with waste storage and to evaluate the consequences of these changes for waste isolation and performance assessment. Thermal testing is conducted in the Exploratory Studies Facility Thermal Test Alcove and Fran Ridge. Thermal data collection and long duration testing forms the repository design basis in support of the Site Recommendation, and the License Application.

Thermal testing in FY 1997 included the completion of the first phase of testing in the single-heater test and installation of the majority of instrumentation, data acquisition, and heating systems in the drift heater test.

Thermal testing activities completed in FY 1997 included:

- Completed the first phase (heat-up) of the single-heater test.
- Completed analyses of the initial data from single-heater test ambient and heat up phases.
- Completed the ambient testing and instrumentation for the Large Block located at the Fran Ridge near the Yucca Mountain site.
- Initiated thermal testing at the large block test at Fran Ridge.
- Installed testing infrastructure systems for the drift heater test.
- Continued ambient condition testing of the drift heater test.
- Developed several predicted models on expected thermal test observations.

Thermal testing activities planned for FY 1998 through FY 2001 include:

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
- Initiate the first phase (heat-up) of the Drift Scale Heater Test. The heat-up phase will continue until 2001. - Prepare a report summarizing initial results from the heat up phase of the Drift Scale Heater Test. - Monitor thermal, hydrologic and geomechanical parameters during testing. - Complete the single element heater test and large-block test. - Perform post-test calculations for both the single heater and large block test and document test results. - Conduct large-block test geochemistry work on the dismantled block. - Drill out selected areas of the single heater test block for geochemical and hydrologic evaluation. - Evaluate new information and update thermohydrologic analysis. - Compile and analyze data on coupled process results for performance assessment and design.					
• **Confirmatory Testing**	**4,076**	**7,000**	**7,000**	**6,600**	**6,600**

Confirmatory testing will collect and analyze data to confirm site hydrologic and geologic conditions that are the bases for the safety case that supports the License Application. Laboratory tests of rock samples and engineered materials will support evaluation of near field process models. This effort will directly support the Total System Performance Assessment for the License Application by reducing uncertainty in calculations of radionuclide releases from the engineered barrier system. Performance confirmation data will be used to fill information gaps or resolve uncertainties and provide additional technical basis for the License Application. The data will be incorporated into process models to be completed in FY 1999 through FY 2000 to support the Total System Performance Assessment-License Application, post-

license application process model refinement, and performance confirmation.

Confirmatory testing activities completed in FY 1997 included:

- Completed and planned several laboratories coupled processes tests in support of the site-scale thermal tests and needed to develop near-field environment models.
- Analyzed additional chlorine-36 and other geochemical samples to validate the unsaturated-zone.
- Completed several laboratory geochemical tests to develop data base needed to evaluate radionuclide transport via colloids.
- Continued experiments on confirming the solubility data of critical radionuclides plutonium and neptunium.
- Continued integrated tests on radionuclide release rate from the engineered barrier system.
- Assembled additional data to confirm the three dimensional mineral distribution models, including zeolite.

Confirmatory testing activities planned for FY 1998 through FY 2001 include:

- Initiate confirmatory field-scale tests to support evaluation of near field environment models. These models involve coupled thermal, chemical, mechanical, and hydrologic processes. They describe how water could enter emplacement drifts, interact with waste packages, and transport radionuclides through the engineered barrier system.
- Confirm predictions of the thermally induced coupled process behavior in the repository near field and altered zone. Confirmatory testing will emphasize changes in fracture permeability and radionuclide-sorption characteristics of the host-rocks along pathways.
- Evaluate test results, and document the basis for modeling of near field processes in the Total System Performance Assessment for the License Application. These

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
tests will be used for the Total System Performance Assessment-License Application and post-license application performance confirmation. These tests will be conducted to confirm predictions of coupled process behavior in the repository near-field and altered-zone environments.					
- Evaluate results from surface-based and underground testing to confirm understanding of the ambient system as represented by site scale process models.					
	6,500	**9,000**	**9,000**	**8,500**	**8,500**

- **Modeling**

The modeling effort will collect and analyze data to support the abstraction of site process models to provide input to the Total System Performance Assessment-License Application and partly to the post-License Application performance assessment activities. Conceptual and numerical models of flow and transport, the near field environment, and repository thermohydrology will be updated to reflect confirmatory data, and the interim results from long duration testing. Process level information will be abstracted in a manner that can be used directly in the total system performance assessment for probabilistic dose calculations.

Modeling tasks completed in FY 1997 included:

- Updated the infiltration map needed to enhance modeling the site-scale and drift-scale percolation fluxes.
- Updated the unsaturated-zone flow models.
- Developed a site-scale and regional scale saturated-zone flow model.
- Developed an initial model report on thermally-driven coupled processes.
- Updated the volume two of the near-field environment report that contains the additional design and model data collected since 1993.

III. Performance Summary | **FY 1997** | **FY 1998** | **FY 1999** | **FY 2000** | **FY 2001**

- Updated the unsaturated-zone and saturated-zone radionuclides transport models with new data available since FY 1996.
- Completed nine model abstraction workshops. They were Unsaturated Zone Flow, Unsaturated Zone Transport, Saturated Zone Flow and Transport, Near-Field Geochemical Environment, Unsaturated Zone Thermal-Hydrology, Waste Package Degradation/Radionuclide Mobilization, Biosphere, and Disruptive Events.

- Collected otherwise irretrievable data, such as seismic, stream flow, pneumatic, and meteorological, to record transient events such as earthquakes, floods, and major storms. Laboratory testing will continue from FY 1997 through FY 2001.

Modeling tasks planned for FY 1998 through FY 2001 include:

- Update numerical models to support total system performance assessment and refine understanding of site geology and hydrology.
- Produce synthesis reports that include conceptual models of geologic, hydrologic, geochemical, and geomechanical processes.
- Support abstraction and testing of process models for total system performance assessment.
- Continue laboratory testing to confirm near field environment models.
- Continue collection of the otherwise irretrievable data, such as seismic, stream flow, pneumatic, and meteorological, to record transient events such as earthquakes, floods, and major storms.
- Update the saturated zone and unsaturated zone models for flow and radionuclide transport, and confirm these models for use in the Site Recommendation and License Application.
- Conduct confirmation activities to compare the most recently available field and

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
laboratory data to selected natural analogue work as appropriate. - Continue data collection and long duration testing for performance confirmation and license application. - Complete the unsaturated zone transport test to investigate scaling effects between laboratory and *in-situ* tests and to validate the site scale transport model for the License Application. - Incorporate data analysis and interpretations of thermal testing into process models that support total system performance assessment.					
• **Special Studies**	**7,600**	**6,669**	**3,500**	**4,000**	**4,000**

Special studies include the updating of the Site Description and other activities that support the Viability Assessment, Site Recommendation, and the License Application. They will include discussion of all data collected related to geology, hydrology, and geochemistry.

Special studies increase as the project approaches completion of process models that support the Total System Performance Assessment-License Application and, post-license application process model refinement.

Special studies completed in FY 1997 included:

- Completed the draft Hydrologic, Geologic, Natural Resources and Climatology chapters of the Site Description document, and initiated the other chapters (Near-field Environment, Geochemistry).
- Initiated a peer review of the environmental isotope data including chlorine-36, in order to enhance credibility of the application these data to validate unsaturated-zone flow and transport models.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001

Special studies planned for FY 1998 through FY 2001 include:

- Continue full documentation of data sources and description of conceptual models of geologic and hydrologic processes operating at the site, and performance confirmation information. Subsequently incorporate record packages into the Technical Information Management System. These data will support continued efforts by performance assessment, repository design and waste package design. Also assist in preparation of the License Application site characteristics part.
- Update the Project Site Atlas to support preparation of the Site Recommendation and License Application. The Site Atlas is a collection of maps and supporting data that describes the geography and geology of Yucca Mountain. Update scientific data in the Reference Information Base, and other technical databases to directly support the integrated repository and waste package designs.

• **Environmental Assessment and Compliance**	**13,500**	**13,500**	**13,500**	**13,500**	**13,500**

Environmental assessment and compliance activities include air quality and meteorology, water resources, archeological and radiological studies, ecosystems and socioeconomic monitoring; maintaining and acquiring requisite permits so that uninterrupted site activities may continue; and conducting surveillances, audits, and assessments of site activities to ensure regulatory compliance.

Environmental assessment and compliance activities remain level through submittal of the License Application.

Environmental assessment and compliance activities completed in FY 1997 included:

- Provided scientific support for preparation of the draft Environmental Impact Statement.
- Continued to collect field-based data in support of the environmental database in

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
part to support the development of the Environmental Impact Statement. - Continued data gathering and reporting of meteorological conditions to provide direct support to design, performance assessments, environmental analyses and radiological dose assessments. Meteorology inputs are also necessary to support the requirements of preclosure radiological safety, regional airflow patterns relative to population centers, and extreme weather conditions relevant to population centers, and extreme weather conditions.					
Environmental assessment and compliance activities planned for FY 1998 through FY 2001 include: - Conduct scientific and engineering reviews of hazardous and solid waste handling and Exploratory Studies Facility designs to ensure compliance with environmental regulations and requirements. - Provide scientific support for preparation of the draft Environmental Impact Statement. - Support preparation of the final Environmental Impact Statement, Record of Decision, and technical documentation for the proposed Site Recommendation, and the License Application. - Perform data gathering and reporting of meteorological conditions to provide direct support to design, performance assessments, environmental analyses and radiological dose assessments. Meteorology inputs are also necessary to support - the requirements of preclosure radiological safety, regional airflow patterns relative to population centers, and extreme weather conditions relevant to population centers.					
TOTAL CORE SCIENCE:	**73,076**	**73,669**	**70,000**	**61,500**	**61,500**

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
DESIGN AND ENGINEERING:					
• **Waste Package Development**	**23,000**	**22,400**	**23,500**	**22,247**	**22,500**

Waste package development activities are performed to develop the basis for predicting post-closure performance of the engineered barrier system and directly support the Viability Assessment, Environmental Impact Statement, and Site Recommendation.

Near term waste package development activities focus on design concept analyses, development of the disposal criticality analysis methodology, and development of degradation process models for waste forms and waste package materials. As the License Application milestone approaches, waste package development activities shifts to design of waste packages to support procurement from vendors, refinement of the disposal criticality analysis methodology, and confirmation of waste form/waste package material degradation process models to reduce uncertainties in analyzing post-closure performance.

Waste package development activities completed in FY 1997 included:

- Completed waste package reference design to support the Viability Assessment.
- Coordinated and planned waste package material testing, modeling, design, and documentation for the reference design and Total System Performance Assessment-Viability Assessment.
- Maintained and updated requirements and criteria to guide waste package design activities and decision making.
- Performed thermal, structural, criticality, and shielding analyses to develop waste package requirements for the reference design.
- Developed fabrication and verification methods and cost estimates for the reference waste package design.

III. Performance Summary | **FY 1997** | **FY 1998** | **FY 1999** | **FY 2000** | **FY 2001**

- Developed and enhanced process models for waste forms and waste package materials to support release performance assessments and reduce uncertainty in analyzing post-closure repository performance.
- Analyzed waste package material and waste form specimens for response to long-term corrosion environments.
- Developed and issued the Technical Report on the Disposal Criticality Analysis Methodology. Conduct performance evaluations for waste package size and waste package materials support analyses for alternative repository concepts.

Waste package development activities planned for FY 1998 through FY 2001 include:

- Provide waste package design input to the License Application performance assessment.
- Conduct and document waste package design for Site Recommendation design description.
- Coordinate and plan waste package material testing, modeling, design development, and documentation.
- Maintain and update requirements and criteria to guide waste package design activities and decision making.
- Perform thermal, structural, criticality, and shielding analyses to develop waste package designs to support the safety case for the License Application.
- Develop fabrication and verification methods and cost estimates for the detailed design reference waste package design.
- Develop and enhance process models for waste forms and waste package materials to support release performance assessments and reduce uncertainty in predicting post-closure repository performance.
- Analyze waste package material and waste form specimens for response to long-term corrosion environments.
- Develop and issue the Disposal Criticality Analysis Methodology Topical Report.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
Update the Topical Report to reflect most current data and requirements. - Conduct performance evaluations for waste package size and waste package materials support analyses of alternative repository concepts.					
• **Surface Facilities Design**	**13,000**	**8,488**	**11,397**	**15,000**	**18,000**

Design of surface facilities will be consistent with regulatory requirements and Mined Geologic Disposal System infrastructure needs. Site buildings include: waste handling, waste treatment, carrier preparation, transporter maintenance, airlock, visitor center, warehouse, maintenance shops, administration, utilities, fire/medical center, service station, and security stations. Design support will be provided for site characterization work tasks.

Site and surface design provides the basis for waste handling, safeguards and security, and infrastructure necessary to support the Viability Assessment, Site Recommendation, and License Application.

Site and surface design is a continuous process with an increasing level of detail as we approach License Application and Construction Authorization. A reference design was completed in FY 1997 and supports the Total System Performance Assessment-Viability Assessment and Viability Assessment design. The site and surface design input to performance assessment for the License Application will be completed in FY 1999. The Site Recommendation design description will be completed in FY 2001 and will be updated to support the submittal of the License Application.

Surface engineering design effort to support performance assessment activities for the License Application peaks between FY 2001 and FY 2002.

III. Performance Summary | **FY 1997** | **FY 1998** | **FY 1999** | **FY 2000** | **FY 2001**

Site and surface design products developed in FY 1997 included:

- Completed site and surface reference design to support the Viability Assessment.
- Developed nuclear facility general arrangement drawings.
- Developed repository surface site layout drawings.
- Developed waste handling flow diagram.
- Developed secondary waste treatment flow diagram.
- Developed heating, ventilation, air conditioning flow diagram.
- Developed site and surface system descriptions to be used as a basis for design.
- Developed criteria studies for site generated waste and other waste forms.
- Developed reference design for site safeguards and security systems such as general site control safeguards and security systems, emergency response systems, health and safety, and environmental monitoring.
- Developed reference design for the waste handling systems.
- Developed reference design for the carrier/cask shipping systems.
- Developed reference design for the waste preparation and treatment facility.
- Developed controlled and uncontrolled area plot drawings.
- Provided site characterization design support to the Exploratory Studies Facility and Enhanced Characterization of the Repository Block.

Site and surface design products planned for FY 1998 through FY 2001 include:

- Complete site and surface design for the License Application performance assessment input.
- Complete site and surface design for Site Recommendation design description.
- Design intra-state and intra-site logistics system to permit transport of waste and include systems such as general site transportation, off-site rail and road, and subsurface transport system.
- Develop system descriptions to be used as a basis for design.
- Develop criteria studies for site generated waste and other waste forms.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
- Develop viable design options to determine the best combinations of features for site facilities and support infrastructure. - Design geologic repository surface operations area and support systems. - Develop Mined Geologic Disposal System site layout. - Design site security and safeguard systems such as general site control security and safeguards systems, emergency response systems, health and safety, and environmental monitoring. - Design waste handling systems. - Design carrier/cask shipping systems. - Design systems for waste preparation and treatment. - Develop controlled and uncontrolled area plot drawings. - Develop construction, operations, and maintenance plans. - Provide site characterization design support to the Exploratory Studies Facility and Enhanced Characterization of the Repository Block. Additional site and surface design products initiated in prior fiscal years and concluded in FY 2001 include: - Design utility systems such as site electrical, water, communications, off-site utilities and compressed air.					
• **Subsurface Facilities Design**	**14,000**	**13,000**	**20,000**	**17,800**	**18,047**
Design of subsurface facilities and operating systems will be consistent with regulatory requirements. Subsurface facilities include emplacement drifts, performance confirmation drifts, access and operating corridors, and ventilation shafts and drifts. Subsurface design provides the basis for repository performance and subsurface waste handling necessary to support the Viability Assessment, Site Recommendation, and					

III. Performance Summary **FY 1997** **FY 1998** **FY 1999** **FY 2000** **FY 2001**

License Application.

Subsurface design is a continuous process with an increasing level of detail as we approach License Application and Construction Authorization. A reference design was completed in FY 1997 that supports the Total System Performance Assessment-Viability Assessment and Viability Assessment design. The subsurface design input to Total System Performance Assessment for the License Application will be completed in FY 1999. The Site Recommendation design description will be completed in FY 2001 and will be updated to support submittal of the License Application.
The subsurface engineering design effort to support performance assessment activities for the License Application peaks in FY 1999.

Subsurface design products developed in FY 1997 included:

- Completed subsurface reference design to support the Viability Assessment.
- Developed system descriptions to be used as a basis for design.
- Developed criteria studies for waste retrievability, mapping, post closure standards, and seals concepts.
- Developed viable design options for subsurface facilities and waste isolation systems.
- Conducted performance evaluations of thermal loading and engineered barrier systems.
- Prepared subsurface development plan.
- Developed reference design for the repository shafts and ramps.
- Developed reference design for the waste emplacement and retrieval systems.
- Developed reference design for the subsurface facilities and utilities such as electrical distribution, water collection and removal, fire suppression, environmental monitoring, ground support, ventilation, emplacement drift backfill, engineering barrier system, potable water, and compressed air.

III. Performance Summary | **FY 1997** | **FY 1998** | **FY 1999** | **FY 2000** | **FY 2001**

- Developed reference design for the radiological control systems.
- Developed reference design for the engineered barrier systems such as emplacement drift lining, inverts, pedestals, backfill, and drip shields.
- Developed reference design of the performance confirmation systems.

Subsurface design products planned for FY 1998 through FY 2001 include:

- Complete subsurface design for the License Application performance assessment input.
- Complete subsurface design for Site Recommendation design description.
- Develop system descriptions to be used as a basis for design.
- Develop criteria studies for waste retrievability, mapping, post closure standards, and seals concepts.
- Develop viable design options to determine the best combinations of features for subsurface facilities and waste isolation systems.
- Conduct performance evaluations of thermal loading and engineered barrier systems.
- Prepare subsurface development plan.
- Design repository shafts and ramps.
- Design waste emplacement and retrieval systems.
- Design subsurface facilities and utilities such as electrical distribution, water collection and removal, fire suppression, environmental monitoring, ground support, ventilation, emplacement drift backfill, engineered seal system, potable water, and compressed air.
- Design the radiological control systems.
- Design the engineered barrier systems such as emplacement drift lining, inverts, pedestals, backfill, and drip shields.
- Design performance confirmation systems.
- Develop construction, operations, and maintenance plans.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
• **Systems Engineering**	**20,028**	**19,000**	**23,800**	**24,000**	**24,000**

Systems engineering develops engineering standards and design bases; evaluates compliance of designs with regulatory requirements; performs special studies related to waste disposition; and functions as a technical interface between design groups to assure integrated design products to support the Viability Assessment, Site Recommendation, and License Application.

Systems engineering costs increase in the out-years resulting from a planned increase in resources to perform system studies and analyses to support the Site Recommendation and License Application.

Systems Engineering activities performed in FY 1997 included:

- Provided system engineering coordination and planning for an integrated design process.
- Developed and maintained design interface control systems and documentation.
- Developed and maintained system design basis documentation.
- Provided compliance analyses of engineered systems and facilities.
- Performed data analyses and performance confirmation assessments.
- Developed requirements for repository operations and maintenance.
- Developed documentation of program and project management controls.
- Coordinated systems integration.
- Conducted special studies.
- Provided technical interface to design groups, Department of Energy, and other agencies, as required.
- Performed specialty engineering reviews, designs, and studies, such as thermal goal evaluations, waste acceptance criteria, and regional transportation.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
- Conducted Determination of Importance Evaluation analysis. - Coordinated and established systems for engineering quality assurance. Systems Engineering activities from FY 1998 through FY 2001 include: - Provide system engineering coordination and planning for an integrated design process. - Develop and maintain design interface control systems and documentation. - Develop and maintain system design basis documentation. - Provide compliance analyses of engineered systems and facilities. - Perform data analyses and performance confirmation assessments. - Maintain requirements for repository operations and maintenance. - Develop documentation of program and project management controls. - Coordinate systems integration. - Conduct special studies. - Provide technical interface to design groups, Department of Energy, and other agencies, as required. - Develop a total system life cycle cost. - Perform specialty engineering reviews, designs, and studies, such as thermal goal evaluations, waste acceptance criteria, and regional transportation. - Conduct Determination of Importance Evaluation analysis. - Coordinate and establish systems for engineering quality assurance.					
TOTAL DESIGN AND ENGINEERING:	**70,028**	**62,888**	**78,697**	**79,047**	**82,547**
SUITABILITY/ LICENSING AND PERFORMANCE ASSESSMENT:					
• **Licensing**	**2,420**	**4,680**	**5,000**	**7,500**	**6,000**

III. Performance Summary

	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001

Preparation of licensing documentation will incorporate site characteristics, design information and performance assessment results. The License Application describes site characteristics, surface and subsurface design, operations and maintenance plans for surface and subsurface facilities, performance assessment results and how these facilities comply with applicable regulatory requirements. This document is submitted to the Nuclear Regulatory Commission for review.

Interactions with the Nuclear Regulatory Commission staff will focus on two objectives: reaching a common understanding regarding the issues that are significant to overall repository performance, and reaching agreement on the adequacy of proposed methodologies and approaches to address important technical issues, such as criticality control and seismic design. The goal is to reach a mutual understanding of the repository concept as it develops. This understanding will provide a basis for Nuclear Regulatory Commission preliminary comments on the sufficiency of site characterization and design information for inclusion in a license application.

Licensing tasks completed in FY 1997 included:

- Developed the overall repository concept before addressing specific issues related to licensing.
- Interacted with Nuclear Regulatory Commission staff throughout this process regarding issues affecting licensing, and approaches and methodologies for addressing specific technical issues.

Licensing tasks planned for FY 1998 through FY 2001 include:

- Complete the License Application Plan component of Viability Assessment. The License Application Plan will include descriptions of any additional work necessary to complete the application for construction authorization and will be completed in FY 1998.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
- Develop Seismic Methodology Topical Report III. This third and final Seismic Methodology Topical Report will be completed for submittal to the Nuclear Regulatory Commission in FY 1999. Early Nuclear Regulatory Commission staff acceptance of the seismic methodology used in the design of a repository will reduce programmatic risk to the Department of Energy. - Interact with the Nuclear Regulatory Commission and provide comments on anticipated rulemaking actions to amend 10 CFR Part 60 to conform to the requirements of the Energy Policy Act of 1992. This is a long duration activity and is expected to increase in the out-years. - Continue development of the draft License Application through FY 2000 which incorporates the results from Design and Engineering, and Core Science activities, and Nuclear Regulatory Commission comments on the sufficiency of the available information for inclusion in the License Application. - Complete the administrative record for the License Application. Completion of this activity is planned for FY 2000. This will be a record of all referenced citations, reports, evaluations, models, calculations, and design packages used to develop the License Application. For each supporting document, a compilation will be made of all information that was directly considered in its development, the assumptions that were made, and a rationale for why the information was or was not used. - Develop a Physical Security Plan in support of the License Application. Note: In FY 1999, the Performance Assessment is combined with Suitability and Licensing. After the Viability Assessment, Performance Assessment is an integral part of the work to prepare a Site Recommendation and a License Application.					
• **Technical Information Management**	**7,063**	**10,900**	**11,500**	**10,000**	**9,500**
Technical Information Management activities will result in an integrated information					

management system that is made up of hardware, software, and administrative controls that allows the development, reporting, and archiving of licensing documentation. This includes management of information associated with data acquisition, model development, data extraction and analysis, report and design development, accessing and changing of base information, project and public access to electronic and hard copy information, and finally archiving of information and data.

Technical Information Management activities completed in FY 1997 included:

- Completed and distributed a controlled set of spatial data, updated the Project Site Atlas, and issued new sets of information in the Reference Information Base.
- Performed all activities necessary to screen, image, index and quality check images of records in preparation for the electronic docketing system.
- Initiated technology assessment of optical character recognition (an image pattern recognition in support of full text search capabilities).
- Continued to compile reference information, and maintain the automated Technical Data Tracking System for reporting the acquisition and development of technical data.
- Continued to identify, compile, incorporate and maintain technical data in the Site and Engineering Properties and Geographic Information database components of the Geographic Nodal Information Study and Evaluation System.
- Continued to compile and maintain summarized and interpretive data in the Reference Information Base.
- Continued to maintain the Waste Form Characteristics data, the Chemical Species Thermodynamic data, and Modeling data.
- Developed spatial data coverages and maps.
- Qualified (consistent with quality assurance requirements for data qualification) previously unqualified data that were relevant for inclusion in the analyses supporting technical positions and/or compliance arguments in the License

Application.

- Continued to enhance the Records Management System to incorporate changes and improvements, including those requested by the Nuclear Regulatory Commission and Advisory Review Panel, and through the incorporation of applicable access and retrieval technologies to support the License Application and electronic docketing functions.
- Continued to perform all activities necessary to screen, image, index, and quality check images of incoming records material. Performed optical character recognition text conversion of record images.

Technical Information management activities planned for FY 1998 through FY 2001 include:

- Complete and distribute a controlled set of spatial data, update the Project Site Atlas, and issue new sets of information in the Reference Information Base.
- Perform all activities necessary to screen, image, index and quality check images of records in preparation for the electronic docketing system.
- Continue to compile reference information, and maintain the automated Technical Data Tracking System for reporting the acquisition and development of technical data.
- Continue to identify, compile, incorporate and maintain technical data in the Site and Engineering Properties and Geographic Information database components of the Geographic Nodal Information Study and Evaluation System.
- Continue to compile and maintain summarized and interpretive data in the Reference Information Base.
- Continue to maintain the Waste Form Characteristics data, the Chemical Species Thermodynamic data, and Modeling data.
- Develop spatial data coverages and maps.
- Qualify (consistent with quality assurance requirements for data qualification) previously unqualified data that are relevant for inclusion in the analyses supporting

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
technical positions and/or compliance arguments in the License Application. - Continue to enhance the Records Management System to incorporate changes and improvements, including those requested by the Nuclear Regulatory Commission and Advisory Review Panel, and through the incorporation of applicable access and retrieval technologies to support the License Application and electronic docketing functions. - Continue to perform all activities necessary to screen, image, index, and quality check images of incoming records material. Perform optical character recognition text conversion of record images.					
• **Site Recommendation**	**1,535**	**1,500**	**2,000**	**1,500**	**2,000**
Preparation of the Site Recommendation documentation will incorporate site characteristics and design information. The Site Recommendation will provide a comprehensive statement of the basis for recommendation including: description of the proposed repository with preliminary engineering specifications; description of the waste form and proposed packaging; and an explanation of the relationship between the waste form or packaging and the geologic medium. The explanation of the relationship between the waste form or packaging and the geologic medium will state the results of the total system performance assessment sensitivity analyses. In addition, the Site Recommendation statement will include a discussion of data, obtained in site characterization activities, relating to the safety of the site; preliminary comments from the Nuclear Regulatory Commission concerning the extent to which the at-depth site characterization analysis and the waste form proposal seem to be sufficient for inclusion in the License application; and the views and comments of the Governor and legislature of Nevada, and the governing body of any affected Indian tribes, together with the response of the Secretary to such views.					

III. Performance Summary

FY 1997	FY 1998	FY 1999	FY 2000	FY 2001

The Office of Civilian Radioactive Waste Management will submit the proposed Site Recommendation to the Secretary of Energy in FY 2001. The Site Recommendation will be based on the 10 CFR Part 960 Compliance Report, supporting documentation such as the final Environmental Impact Statement and preliminary comments from the Nuclear Regulatory Commission on sufficiency of site characterization information If approved, the Secretary will issue the Site Recommendation to the President.

Site Recommendation activities completed in FY 1997 included:

- Provided support to 10 CFR Part 960 rule making.
- Conducted expert elicitations to quantify uncertainties for performance assessment and process models.

Site Recommendation activities planned for FY 1998 through FY 2001 include:

- Complete 10 CFR Part 960 rule making.
- Complete Site Recommendation plan.
- Complete 10 CFR Part 960 compliance evaluation.
- Prepare 10 CFR Part 960 compliance evaluation of DOE's repository siting guidelines in FY 1999.
- Develop a draft Site Recommendation in FY 2000.
- Receive and consider preliminary comments from the Nuclear Regulatory Commission on the sufficiency of the information available from site characterization for inclusion in the License Application.
- Develop the Notice of Consideration and all supporting documentation to inform the public and announce a schedule for public hearings on the consideration, by the Secretary of Energy, of a decision regarding recommendation of the site in FY 2001.
- Complete the record for the Site Recommendation in FY 2001. The record will

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
include a history of the development of the documents supporting the Site Recommendation. For each supporting document, a compilation will be made of all information that was directly considered in its development, the assumptions that were made, and a rationale for why the considered information was or was not used.					
• **Total System Performance Assessment – Viability Assessment**	**5,000**	**7,000**	**2,500**	**0**	**0**

Development of the Total System Performance Assessment-Viability Assessment will serve as the principal vehicle for integrating the products of the scientific, design, and engineering program elements, and as such constitutes a key component of the 1998 Viability Assessment. In the Total System Performance Assessment-Viability Assessment, relevant abstracted model results, simplified process models, and design information will be combined and a reference case set of parameters to determine expected repository performance will be developed. Performance measures will include estimated doses to affected populations and/or releases at specified boundaries. Total System Performance Assessment-Viability Assessment will present sensitivity and uncertainty analyses to define the key parameters that impact total system performance and to evaluate the significance of alternative assumptions to the confidence in the overall prediction. The impacts of the Total System Performance Assessment-Viability Assessment results to the scientific and design products will be described, and recommendations for testing and design modifications which could significantly reduce uncertainty or enhance performance will be made. Revisions and enhancements to these models and parameters will be reflected in the Total System Performance Assessment analyses supporting the License Application.

Total System Performance Assessment-Viability Assessment activities completed in FY 1997 included:

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
- Incorporated structural geologic, stratigraphic, and hydrogeologic data gained from the completed five-mile tunnel and additional data from surface boreholes into models. Information was incorporated into performance assessment subsystem models. - Updated the Total System Performance Assessment analysis. The results of the Total System Performance Assessment will serve as the principal vehicle for integrating products of the scientific, design, and engineering program elements.					
Total System Performance Assessment-Viability Assessment activities planned for FY 1998 through FY 1999 include: - Issue Total System Performance Assessment-Viability - Initiate the first in a series of activities supporting software qualification for Total System Performance Assessment, Saturated Zone Flow Software Qualification. Provide uncertainty analysis and data input into the biosphere model in FY 1998.					
• **Total System Performance Assessment – License Application**	**7,165**	**7,063**	**10,000**	**10,000**	**11,500**
The Total System Performance Assessment-License Application will serve as the principal vehicle for integrating the products of the scientific, design, and engineering program elements, and as such constitutes a key component of the FY 2002 License Application to the Nuclear Regulatory Commission. In the Total System Performance Assessment-License Application, relevant abstracted model results, simplified process models, and design information will be combined and a reference case set of parameters to determine expected repository performance will be developed. Performance measures will include estimated doses to affected populations and/or releases at specified boundaries. The Total System Performance Assessment-License Application will present sensitivity and uncertainty analyses to define the key parameters that impact					

total system performance and to evaluate the significance of alternative assumptions to the confidence in the overall prediction.

Total System Performance Assessment-License Application activities completed in FY 1997 included:

- Developed a Performance Confirmation Plan to identify short and long term tests and analyses needed to verify performance predictions.
- Developed criteria and parameters for biosphere model analysis and selection.

- Completed the first Total System Performance Assessment peer review activity phase, the Total System Performance Assessment Orientation.

Total System Performance Assessment-License Application planned for FY 1998 through FY 2001 include:

- Complete all peer review interim reports for the Total System Performance Assessment-Viability Assessment in FY 1998.
- Complete the peer review of the Total System Performance Assessment-Viability Assessment, one of the components of the Viability Assessment completed in FY 1998. During this final module of the peer review process, the Total System Performance Assessment-Viability Assessment report will be presented to the peer review panel and results will be described. Following the review, the panel will deliver a report documenting the conduct and results of the peer review, including any changes in approach, methods, and scope that are recommended for use in the performance assessment that will support the License Application.
- Complete final peer review reports for the Total System Performance Assessment-Viability Assessment in FY 1999.
- Activities associated with the second phase, Process Model Review, were initiated in FY 1998. During the Process Model Review activity, the Department of Energy

is to demonstrate relationships between understanding site processes and features, and numerical process models that describe these processes and features.

- Perform assessment activities on refining models and conducting sensitivity analyses to support the total system performance assessment that will be input to the draft Environmental Impact Statement, preparation of the Site Recommendation, and preparation of the License Application in FY 1999.
- Respond to new site and design information and the recommendations from the Total System Performance Assessment-Viability Assessment peer review.

- Provide Sensitivity analysis/quantification of final biosphere modeling inputs in FY 1999.
- Provide updated total system performance assessment analyses and sensitivity studies to support preparation of the final Environmental Impact Statement and the Site Recommendation in FY 2000. Additional analyses may be needed in response to comments on the draft Environmental Impact Statement.
- Complete total system performance assessment sensitivity analysis for the License Application in FY 2000. The total system models from Total System Performance Assessment-Viability Assessment, and other models, will be updated in order to show how the system performs under the applicable system regulations. Recommendations from the Total System Performance Assessment-Viability Assessment peer review will be implemented, where appropriate. Results from the Total System Performance-Viability Assessment and Core Science testing will be used to update process-level models for input into the sensitivity analysis.
- Incorporate results of continuing model abstraction and testing into the sensitivity analyses that will include a comparison of the sensitivity analyses used in previous total system performance assessments and document and review this work.
- Convene a working group, similar to the one formed for the thermohydrologic models abstraction/testing activities conducted for the Viability Assessment in FY

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
2000. This group will assure proper integration of information that may become available after the Viability Assessment and that may have changed the bases for the process models underlying the Total System Performance Assessment model. Uncertainties will be reviewed to ascertain whether they need to be incorporated in the Total System Performance Assessment for the License Application. Additional sensitivity analyses will be conducted to identify those areas where further Design and Engineering and/or Core Science activities are required to reduce uncertainties in the total system performance assessment.					
- Continue Performance Assessment activities to support completion of the License Application and analyses to support completion of integrated repository and waste package design through FY 2001.					
.					
TOTAL SUITABILITY/ LICENSING &	**2,420**	**4,680**	**31,000**	**29,000**	**29,000**
TOTAL PERFORMANCE ASSESSMENT:	**20,763**	**26,463**	**0**	**0**	**0**
NEPA:					
• **NEPA**	**1,524**	**4,254**	**2,262**	**2,417**	**1,775**
The NEPA activities will include developing and publishing a draft Environmental Impact Statement in FY 1999 and the final Environmental Impact Statement in FY 2000. Environmental impacts and consequence analysis will be performed for each technical discipline in the Environmental Impact Statement. The preliminary impact analyses will consider results of a total system performance assessment of the repository. Preliminary drafts of the impact analyses and environmental consequences will then be developed and mitigation measures will be identified.					

III. Performance Summary **FY 1997** **FY 1998** **FY 1999** **FY 2000** **FY 2001**

In FY 2000, further refinement of the technical analyses supporting the Environmental Impact Statement will be performed, as required, by the concurrent and ongoing process of site studies and as needed to resolve public, agency or tribal comments on the draft Environmental Impact Statement. This activity will be integrated with the work of the Core Science and Suitability and Licensing activities. The administrative record will be maintained and augmented throughout this year.

NEPA activities completed in FY 1997 included:

- Awarded a contract for a repository Environmental Impact Statement technical support contractor.
- Reviewed scoping comments, categorized issues/concerns, and prepared responses. Drafted a description of proposed actions and alternatives and began analysis of existing design performance and affected environmental data to determine National Environmental Policy Act compliance.

NEPA activities planned for FY 1998 through FY 2001 include:

- Gather additional data as necessary to support environmental analysis.
- Prepare environmental impacts and consequence analysis for each technical discipline in the Environmental Impact Statement in FY 1998. The preliminary impact analyses will consider results of a total system performance assessment of the Repository. Preliminary drafts of the impact analyses and environmental consequences will then be developed and mitigation measures will be identified.
- Continue analysis and work in the technical areas that form the basis and justification of the Environmental Impact Statements conclusions throughout the preparation of the draft Environmental Impact Statement. This process will focus on, but not necessarily be limited to, matters involving socioeconomic impacts,

sensitive ecosystems, analysis of transportation impacts, issues of environmental justice, and the analysis of repository performance and resulting environmental impacts during the preclosure and postclosure periods. This process will be coordinated with the activities of Core Science and Suitability and Licensing, as appropriate. This task is planned for FY 1999.

- Begin development of chapters of the preliminary draft Environmental Impact Statement
- Publish the draft Environmental Impact Statement. This document will be published and distributed nationally for public comment, including comments by appropriate Federal and state agencies and tribal governments in FY 1999. The comment period will continue into FY 2000.
- Develop the Environmental Impact Statement administrative record.
- Conduct public forums and gather comments. The public comment period on the draft Environmental Impact Statement, which began in FY 1999, will continue through the first quarter of FY 2000.
- Refine the technical analyses supporting the Environmental Impact Statement.
- Prepare the final Environmental Impact Statement including review by all appropriate Department of Energy organizations. Revise as needed, prior to being published and distribute to all interested parties on a national basis.
- Prepare and issue the Record of Decision, based on the final Environmental Impact Statement.

TOTAL NEPA: *	**1,524**	**4,254**	**2,262**	**2,417**	**1,775**

* Funding for specific Environmental Impact Statement support is not included in the NEPA totals. It is included in Program Direction.

PROJECT MANAGEMENT:

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
• **Project Management**	**34,037**	**36,042**	**28,864**	**53,064**	**32,364**

Project Management includes planning, budgeting, and scheduling of all the Yucca Mountain Site Characterization Program element activities, facilities and property, site security, telecommunications and rents; records management, procurement, and maintenance and operation of wide/local area networks and computing facilities, in concert with the program-wide information architecture; and motor pool operations. The major components of these activities are: management and integration functions for all approved work, program element control performance measurement system, technical program element management staff, and cost and schedule baseline management. Project management also includes conduct of public information and outreach programs to ensure that open and informative interactions with the public and program element stakeholders are provided.

Project Management activities completed in FY 1997 or planned for FY 1998 through FY 2001 include:

- Plan, budget and schedule program element activities to meet Office of Civilian Radioactive Waste Management program objectives.
- Ensure program element activities are accomplished in accordance with approved workscopes, authorized budgets, and scheduled milestones.
- Provide program element participants with facilities, equipment, systems, and support services needed to perform their approved activities.
- Train program element participants to perform their approved activities.
- Ensure program element activities are performed in accordance with applicable statutes, regulations and Department of Energy orders and directives.
- Provide open and informative interactions with the public and program element stakeholders in accordance with the Nuclear Waste Policy Act Amendment and the

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
Secretary of Energy's customer service policy. - Manage project resources to achieve predetermined objectives of scope, cost, quality, and participant satisfaction. - Manage the outreach program. - Manage the information management system. Project Management includes funding to meet the up front scoring requirements of Office of Management and Budget Circular A-11. In FY 2000, the Yucca Mountain Site Characterization Office must score funding for the renewal of leased office and general purpose facilities for the five-year term of the subsequent out years leases. The requirements for FY 2000 and FY 2001 are scored in FY 2000 resulting in $20.7 million increase in Project Management in FY 2000. The office and general purpose facilities located in Las Vegas, Nevada will be used to house government and contractor personnel engaged in the characterization, scientific studies and design activities supporting the Site Recommendation and License Application.					
TOTAL PROJECT MANAGEMENT	**34,037**	**36,042**	**28,864**	**53,064**	**32,364**
EXTERNAL OVERSIGHT AND PAYMENTS-EQUAL-TO-TAXES (PETT)					
Provide oversight assistance to the appropriate entities.					
Continue to provide Payments-Equal-to-Taxes payments.	**6,827**	**6,900**	**5,600**	**5,600**	**5,600**
TOTAL EXTERNAL OVERSIGHT AND PETT	**7,000**	**11,900**	**18,000**	**18,000**	**18,000**

IV. Explanation of Funding Changes FY 1998 to FY 1999

Changes to the FY 1999 budget include the following: an increase in Operations and Construction (from $47,814 to $69,000) to support the upgrading of the 25 major Exploratory Studies Facility systems, the construction of the Cross Drift alcoves and niches, and additional excavation associated with unsaturated zone core science facility; a decrease in Core Science (from $73,669 to $70,000) which corresponds with the completion of test areas and test setup in the ESF Main Loop (alcoves and niches) and Busted Butte; an increase in Design and Engineering (from $62,888 to $78,697) which reflects an increase in site and surface, and subsurface design and Total System Performance Assessment-License Application activities which are required to support the development of the Site Recommendation, License Application, and Construction Authorization; an increase in Suitability/Licensing (from $4,680 to $31,000) reflects the incorporation of Performance Assessment activities ($26,320) into this budget category, and includes activities required to support the development of the Site Recommendation, License Application including License Application records, Total System Performance Assessment-License Application, and the technical information management system; a decrease in NEPA activities (from $4,254 to $2,262) corresponding to the near completion of the most labor intensive activities; a decrease in Project Management from ($36,042 to $28,864) reflecting the completion of the baseline data collection, the near completion of the impact analyses, and the progress made in the preparation of the numerous chapters and appendices; External Oversight and PETT increases due to the added scope for oversight assistance for appropriate entities.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
NUCLEAR WASTE FUND
(Dollars in thousands)

WASTE ACCEPTANCE, STORAGE AND TRANSPORTATION

I. Mission Supporting Goals and Objectives

The Waste Acceptance, Storage and Transportation (WAST) Program element includes the long-lead time activities that must precede removal of spent nuclear fuel (SNF) from reactor sites once a Federal facility becomes available. This includes a market-driven initiative to create a national transportation capability necessary to accept and transport SNF. The initiative will involve a procurement process beginning with the procurement of business plans for contracts to the private sector for canister, transport cask and storage module production, and waste acceptance and transportation services. This approach offers a market stimulus for commercial development of the equipment and management capability required for the transportation and storage of SNF.

The FY 1999 Budget Request assumes that the Program completes a viability assessment for Yucca Mountain in late 1998. FY 1999 funding will provide for the continuation of the development of the procurement initiative for transportation equipment and services.

Spent Fuel Storage

This activity will be suspended after FY 1999, following receipt from the NRC of a safety assessment report for the Phase I CISF Topical Safety Analysis Report (TSAR).

Transportation

This activity includes planning for a safe, environmentally acceptable, and cost-effective transportation capability. A procurement process is being developed to utilize private sector entities to accomplish the Department's commercial spent nuclear fuel waste acceptance and transportation requirements. The proposed procurement has been phased to facilitate

contract definition and performance. Development of plans for waste acceptance, storage modules, and transportation services and equipment will proceed. This activity also includes the planning, identification and resolution of institutional issues and interactions with stakeholders; technical assistance (NWPA Section 180(c)); the development of analytical processes and transportation databases to support overall Program requirements; and the continuation of burn-up credit studies.

Waste Acceptance

The Waste Acceptance activity includes developing plans for achieving the legal and physical transfer of waste to the Federal Government from the owners and generators of SNF and high-level waste (HLW), once a Federal facility is ready to begin operations; supporting the transportation, storage and disposal of waste, once accepted; and developing recommendations for the Department's waste acceptance policy. Activities required to facilitate waste acceptance include: 1) development of a process for the orderly transfer of SNF and HLW into the Federal system consistent with the needs of both the Federal Government and the owners and generators; 2) development of a plan to carry out the Program's waste acceptance responsibilities; 3) continuation of a collaborative dialogue with the Nation's nuclear utility companies as well as other owners and interested stakeholders; 4) verification of the fees collected for commercial SNF; 5) maintenance and implementation of the provisions in the Standard Disposal Contract; and 6) provision of contingency planning support, studies and analyses directed toward the market-driven initiative.

MPC Subsystem

The Department intends to provide the private sector an incentive to stimulate the development and implementation of a multi-purpose canister system compatible with repository disposal requirements.

Project Management and Administration

Project Management and Administration (PM&A) consists of activities and tasks that support each of the product areas for the WAST Project. Specifically, the PM&A area includes the traditional areas of project management, project control, and technical and programmatic integration of tasks and activities across the Project. These integration tasks include project integration, systems engineering, environmental safety and health, National Environmental Policy Act (NEPA) compliance, and quality compliance.

II. Funding

Program Activity	FY 1997	FY 1998	FY 1999	Change	% Change	FY 2000	FY 2001
WAST							
Spent Fuel Storage	2,582	1,549	500	(1,049)	-67.72%	0	0
Transportation	5,768	3,180	5,500	2,320	72.96%	7,495	19,055
Waste Acceptance	391	523	780	257	49.14%	910	1,460
MPC Subsystem	0	0	3,000	3,000	0.00%	0	0
Project Integration	619	695	725	30	4.32%	725	1,340
TOTAL WAST	**9,360**	**5,947**	**10,505**	**4,558**	**76.64%**	**9,130**	**21,855**

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
Spent Fuel Storage:					
• Submit Centralized Interim Storage Facility (CISF) Topical Safety Analysis Report (TSAR) Revision 0 (Rev 0) to the NRC.	2,152	0	0	0	0
• Respond to NRC questions and interact with the Commission during their review of the CISF TSAR Rev 0 through receipt of NRC's approval of non-site-specific CISF TSAR in FY 1999.	230	1,349	500	0	0

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
• Perform non-site-specific contingency planning for a CISF; Maintain and update data base on industry developments for storage and transportation technology.	200	200	0	0	0
Total Spent Fuel Storage	**2,582**	**1,549**	**500**	**0**	**0**
Transportation					
• Issued for comment the draft (FY 1997), revised draft (FY 1998), and final Request for Proposal (RFP) (FY 2001) for waste acceptance and transportation services including canister, transport cask and storage module production; develop procurement for market-driven waste acceptance and transportation services	4,288	1,855	4,475	6,470	18,030
• Issue Section 180© Notice of Policy and Procedures for implementing NWPA Section , 180© and support preparation and evaluation of grant applications.	140	200	200	200	200
• Continue stakeholder interactions and maintain transportation database.	200	200	200	200	200
• Support ten cooperative agreements	680	625	625	625	625
• Submit Actinide-only Burn-up Credit Topical Report Rev. 1 to the NRC and continue interaction with the NRC.	460	300	0	0	0
Total Transportation	**5,768**	**3,180**	**5,500**	**7,495**	**19,055**

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
Waste Acceptance:					
• Interact with International Atomic Energy Agency (IAEA), NRC, utilities and others concerning safeguards, including evaluation of IAEA approach to safeguards and development of overall safeguards and security/Materials Control and Accounting (MC&A) requirements; Support contingency planning, studies and analyses directed toward issuance of the market-driven approach RFP for waste acceptance and transportation services (FY 2000-2001); Issue appendix to Verification Plan for DOE owned SNF and HLW; Issue Verification Plan for Commercial SNF, and maintain as required.	190	163	170	320	430
• Maintain and implement the provisions of the Standard Disposal Contract; Implement the provisions of the RW/EM Memorandum of Agreement on acceptance of DOE owned waste	201	360	540	510	880
• Perform activities associated with the waste acceptance obligations.	0	0	70	80	150
Total Waste Acceptance	**391**	**523**	**780**	**910**	**1,460**
Multi-Purpose Canister Subsystem:					
• The Department intends to provide the private sector an incentive to stimulate the development and implementation of a multi-purpose canister system compatible with repository disposal requirements. The following actions are planned: develop and maintain a controlled envelope that will	0	0	3,000	0	0

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
provide the program's current knowledge of the waste package performance requirements; prepare a technical report that will compile existing understanding of the proposed waste package designs based on Yucca Mountain site characteristics; provide a set of performance requirements for the disposable canister system; and evaluate, as appropriate, the current vendor storage/transport hardware designs for compatibility with repository disposal requirements.					
Total Multi-Purpose Canister Subsystem	**0**	**0**	**3,000**	**0**	**0**
Project Management & Administration:					
• Provide cost, schedule, planning, and integration related tools and services: cost and schedule baseline management; Strategic and Program Plan development/update; and project management documentation; project control functions by monitoring cost, schedule and technical performance, performing variance analyses, and developing and implementing corrective actions.	170	130	160	160	300
• Develop the OWAST Annual Plan, and support the project validation review process; Update the Project Cost & Schedule Baseline Project Summary Schedule WBS Structure and Dictionary and Long-Range Plan, as required	280	280	280	280	400
• Prepare CRB/OMB/Congressional budget submittals	50	90	90	90	120

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
• Maintain WAST life cycle cost estimate, support TSLCC, and update WAST Program element LCC Report; maintain and manage the technical baseline; conduct/coordinate system studies and analyses including the WAST Operations Plan; and perform/support verification and design control.	119	195	195	195	520
Total Project Management & Administration	**619**	**695**	**725**	**725**	**1,340**

IV. Explanation of Funding Changes FY 1998 to FY 1999

- The FY 1999 budget request assumes the Program will intensify efforts between FY 1999 and FY 2003 to support issuance of a final RFP for Regional Servicing Contractors (RSCs) in FY 2001 and award of RSC Phase A contracts early in FY 2003. The increase in MPC Subsystem is to stimulate the private sector to develop a multi-purpose canister system that is compatible with repository disposal.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
NUCLEAR WASTE FUND
(Dollars in thousands)

PROGRAM INTEGRATION

Mission Supporting Goals and Objectives

QUALITY ASSURANCE

This Program element identifies and ensures implementation of federally mandated requirements for Nuclear Quality Assurance (QA) applicable to the CRWMS program activities related to radiological health and safety and waste isolation. It establishes and maintains a Quality Assurance Program formulated to ensure quality in activity planning and performance, thereby ensuring quality of the end-products. Documented compliance with these quality requirements establishes confidence in the effective implementation of the CRWMS program to support the execution and eventual licensing and/or certification of high-level nuclear waste operation activities.

Activities associated with the quality assurance (QA) function, while performed by personnel not associated with the performer organization (NRC independence requirements), are **directly** related to the acceptability of the technical products and services provided by the performer organization. Before technical products and services can be deemed acceptable, reviews, audits, and surveillance (as appropriate) by the QA organization must be performed. QA is not an administrative function, but rather a necessary step (per NRC regulation) to assure technical acceptability such that we are confident in fulfilling our mission to protect the public, workers, and the environment. To maintain the high level of objectivity necessary to satisfy NRC requirements, the contractor support relied upon by the QA function must be independent of the Program's principal site investigators. The QA element achieves this independence by utilizing support service contract personnel who are independent of the Program's Management and Operations contractor. For this reason, all QA funding is displayed in the Program Direction element, and not in the budget elements where the substantive QA work is performed.

PROGRAM MANAGEMENT & INTEGRATION

Systems Integration

The overall objective of the Systems Integration unit is to ensure development of an integrated waste management system, e.g., that the various components of the waste management system such as transportation services procurement activities and repository and waste package design activities, are integrated into a single system that meets mission requirements and is safe, efficient, reliable, and cost-effective. This element coordinates, interprets, and baselines technical requirements of the total system; manages the OCRWM Program baseline and operates and maintains the OCRWM wide Configuration Information System (CIS); prepares the Total System Life Cycle Cost and fee adequacy reports; conducts system studies for alternative and contingency operational system configurations; evaluates and defines criteria for acceptance of other waste forms for disposal; facilitates and implements Memoranda of Agreement (MOA) with Defense waste producers; leads and coordinates OCRWM/Environmental Management (EM), Fissile Materials Disposition (MD), and Naval Reactors (NR) interface activities and conducts reviews and analyses on identified issues; maintains current descriptions of the system, its components, and interfaces; enhances communication among parties responsible for individual system components and functions to ensure smooth flow at interfaces; develops technical interface schedules for the Program; develops and maintains a capability to fully assess alternative concepts; conducts systems studies to ensure that proposed changes to all integrated waste management can be considered with an understanding of the interactions of the various system components; recommends improvements and supports development of equipment and processes having the potential to improve the system.

The Systems Integration Unit provides support and strategic planning assistance to the project offices and to the Director. This includes conduct of various tradeoff and sensitivity studies. Periodically, this unit conducts Total System Life-Cycle Cost (TSLCC) analyses to help determine whether program revenues are sufficient to cover the cost of the program. A companion analysis of the fee adequacy provides, in accordance with the Nuclear Waste Policy Act of 1982, the Department's recommendation on the fee charged to generators of commercial Spent Nuclear Fuel (SNF).

Regulatory Integration

The mission of the Regulatory Integration unit is to ensure that the activities leading to the final waste management system, including commercial and Department-owned nuclear materials, are consistent with the regulatory guidance provided by the governing authorities. Regulatory activities include helping to ensure that project activities are consistent with Departmental policy and environmental impact statements for other Department programs. The focus is on plans and strategies for compliance with applicable

statutes and regulations. The approach to accomplishing this mission is to conduct regulatory reviews, and continue interactions with several external oversight agencies, including the Nuclear Regulatory Commission (NRC), Environmental Protection Agency (EPA), and Nuclear Waste Technical Review Board (NWTRB). Interactions include addressing management and technical issues related to the repository project, interim storage, and transportation of spent fuel and high-level waste. Interactions with the NRC on licensing issues are critical to the success of the overall program schedule because they directly impact the NRC licensing process for program activities and facilities.

Planning

This element supports the Director's program planning requirements by integrating policy direction received from the Administration, Congress, or the Office of the Secretary into an overall strategy and provides program planning documentation. It provides resources for the development and maintenance of OCRWM's multi-year strategic and program plans, as well as OCRWM's annual performance plans. These documents are used as guidance to efficiently and effectively integrate and implement policy direction into the OCRWM's activities. This element provides funding for responses to program inquiries, development of strategic planning documents, interface requirements with external program oversight parties and liaison activities with other related offices and programs within the Department, including the DOE Strategic Plan.

International Waste

This activity keeps OCRWM abreast of international developments and new ideas, and affords the opportunity to influence international opinion and direction on strategies for world-wide disposal of spent nuclear fuel and high-level waste. This unit assists in preparing for bilateral meetings and provides OCRWM's inputs to various international fact and information books.

Program Management

The key components of this element are business and management center planning, formulating and executing budgets and annual work plans, and establishing Program- and project-level cost, schedule, and technical baselines. Program Management provides the basis for: determining, prioritizing, and allocating Program resources; defining, costing, and executing work scope and schedules; and monitoring, analyzing, and improving Program performance.

HUMAN RESOURCES AND ADMINISTRATION

Human Resources Development

The activity supports the quality assurance training, personnel qualifications and records activities at Headquarters. Additionally, the activity assists in the maintenance and improvement of personnel job related skills and capabilities.

Audits, Education and Information

This element encompasses diverse activities that support OCRWM's mission, including compliance with legislative requirements to develop and submit an Annual Report to Congress, develop and submit OCRWM's financial statements to the Department's Chief Financial Officer, develop and submit OCRWM's Annual Assurance Memorandum to the Secretary, and developing and submitting to Congress, OMB and GAO, Departmental responses to recommendations in GAO and DOE IG audit reports. Development of an appropriate investment strategy and the prudent management of the Nuclear Waste Fund investment portfolio are essential to fulfilling OCRWM's fiduciary responsibility under the NWPA. Public information and education activities conducted by the OCRWM National Information Center support the NWPA objective of keeping the public informed of Program activities and assist in building customer, stakeholder, and public confidence in and support for the Program. OCRWM's Historically Black Colleges and Universities Undergraduate Scholarship Program and Radioactive Waste Management Graduate Fellowship Program support the Department's compliance with Executive Order 12677 and the Secretary's science education initiative as well as ensuring that OCRWM's future need for a diversified workforce of highly specialized scientists and engineers will be met.

Information Management

This activity encompasses the strategic application of information technology to: support the accomplishment of OCRWM's mission by providing integrated information systems, solutions and services that enhance the productivity of OCRWM's human resources, drive business process improvement efforts, reduce overall Program costs, and support "reinventing government" and Departmental strategic alignment initiatives. Information management activities include the design and development of information systems to support the management and disposal of the Nation's spent nuclear fuel and high-level radioactive waste; providing a reliable infrastructure for effective and timely access to, and communication of, information; ensuring integration and integrity of technical, regulatory, management, and financial information; streamlining of Program work processes through automation to reduce the paperwork burden and increase the productivity and job satisfaction of OCRWM's human resources; and promoting an organizational

culture based on proactive planning, compliance with Federal and Departmental regulations, and responsiveness to Program dynamics; and support the collection and storage of records required for licensing.

Contract Business Management

This element encompasses diverse activities relating to program wide contract management and contract administration functions. In FY 1997 and prior years, this element included funding for the administrative and operating expenses of the OCRWM technical support contractor at Headquarters. In accordance with Departmental guidance, all funding for Support Service Contractor's are displayed in the Program Direction portion of the budget request.

III. Funding

Program Activity	FY 1997	FY 1998	FY 1999	Change	% Change	FY 2000	FY 2001
PROGRAM INTEGRATION							
QUALITY ASSURANCE	878	0	0	0	0.00%	0	0
PROGRAM MANAGEMENT:							
Systems Integration	3,040	2,719	3,125	406	14.93%	3,125	3,125
Regulatory Integration	305	364	820	456	125.27%	820	820
Planning	773	1,026	897	(129)	-12.57%	897	897
International	309	277	309	32	11.55%	309	309
Program Management	1,052	663	844	181	27.30%	844	844
Total Program Management	5,479	5,049	5,995	946	18.74%	5,995	5,995
HUMAN RESOURCES & ADMIN:							
Human Resources Development	10	90	160	70	77.78%	160	160
Audits, Education & Information	1,111	1,162	1,198	36	3.10%	1,198	1,198
Information Management	3,668	3,562	3,830	268	7.52%	3,830	3,830
Contract Business Management	0	0	0	0	0.00%	0	0
Total Human Resources & Admin	4,789	4,814	5,188	374	7.77%	5,188	5,188
TOTAL PROGRAM INTEGRATION	**11,146**	**9,863**	**11,183**	**1,320**	**13.38%**	**11,183**	**11,183**

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001
QUALITY ASSURANCE:					
• Support Yucca Mountain program site characterization and licensing activities.					
• Support the continued revisions to the Technical Baseline and continue the overview of DOE/EM production runs for acceptance of defense vitrified waste and DOE/EM qualification of Spent Fuel Site QA Programs.					
• Conduct audits, surveillance, field QA inspections and reviews as required by NRC regulations; and coordinate performance of the QAMA process.					
• Support the WAST Program element non-site specific design and engineering for an ISF and issuance of draft RFP for Transportation, Storage Module, and Waste Acceptance services.					
• Support system integration, engineering activities; and continue to support EM vitrification and DOE and Navy owned spent fuel activities.					
Total Quality Assurance	878	0	0	0	0
PROGRAM MANAGEMENT & INTEGRATION					
Systems Integration:					
Systems Integration					
• Support the Development of the Requirements Document for the MGDS.					
• Streamline the CRWMS Requirements Document (CRD).					

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001

- Delegate all Systems Requirements Documents to Project level Change Control Boards.

- Revise Program baseline to incorporate Waste Acceptance Requirements and 15 ft. High-Level Waste Canisters.

- Develop and update Total System Description for the OCRWM Program.

- Develop and implement interface management process in response to the 1996 QA Management Assessment.

- Update Program technical baseline to reflect current policy, Administration/Congressional direction, and resolution of unverified requirements.

- Support Viability Assessment, License Application, and Waste Acceptance, Transportation and any non-site specific Centralized Interim Storage reviews.

- Coordinate Program-level System Integration Design Reviews.

Systems Analysis

- Develop, review, and publish CRWMS Total System Life Cycle Cost estimate and Report on Fee Adequacy to meet statutory requirements and support cost estimates for Viability Assessment, repository License Application, and acceptance and transportation strategies. This task includes support for all substantiating documentation, analyses and independent reviews.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001

- Develop and review intermediate program cost estimates in support of RW and DOE budget development, Congressional hearings, NWPA legislation impacts, Secretarial milestone Critical Decisions, and other external events. Develop cost estimates to support contingency planning.

- Conduct, review, and issue systems engineering logistics and waste stream analyses to support Program strategic and contingency planning, develop Program policy, and ensure integrated Program and project development. Such analyses will be used in Congressional redirection of OCRWM, as backup analyses for RW NEPA evaluations, and to resolve design and licensing issues.

- Develop and review cost assumption packages in support of Program Cost Estimate (PCE) and TSLCC analyses, maintain and enhance, as necessary, detailed cost computer models, update cost data bases. Maintain and upkeep logistics computer models and data bases.

DOE Nuclear Materials

- Implement required responsibilities established in the Memoranda of Agreement for acceptance of DOE SNF, DOE HLW, and Navy Spent Fuel. This includes support to the MOA Administrator, issuance of SNF and HLW data needs; development of acceptance capacities for DOE and Navy materials requiring acceptance, transportation, and disposal, establishment of fee payment schedules to ensure appropriate allocation of Congressional Defense Nuclear Waste Disposal Appropriations; and evaluation of credits for tax-payer expenditures which benefited CRWMS (in accordance with Inspector General recommendation).

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001
• Develop, review, and publish technical baseline documentation and acceptance criteria for DOE Nuclear Materials. These documents include system engineering requirements documents and design interface control documents. Support development of EM, Navy, and MD documents and records packages demonstrating compliance with OCRWM requirements and providing qualified records packages to support CRWMS licensing and certification needs.					
• Resolve Standard Contract and fee methodology issues. This task includes completion of NYSERDA contract development for acceptance of West Valley Demonstration Project (WVDP) High Level Waste (HLW) and development, issuance, and comment resolution on a Federal Register notice on an updated Defense Fee methodology.					
Configuration/Baseline Management					
• Monitor project level Baseline Change Control Boards' activities.					
• Support control and distribution of Program level controlled documents.					
• Complete testing of modules for OCRWM-wide Configuration Information System (CIS).					
• Provide operations and maintenance support including training for the OCRWM-wide CIS.					
Total Systems Integration	3,040	2,719	3,125	3,125	3,125

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001

Regulatory Integration:

- Coordinate and participate in interactions with external agencies, such as: the Nuclear Regulatory Commission (NRC); the Environmental Protection Agency (EPA); and the Nuclear Waste Technical Review Board (NWTRB). These interactions include address management and technical issues related to the repository project, interim storage, and transportation of spent fuel and high-level waste

- Coordinate and integrate program environmental, safety, and health activities to ensure compliance with Departmental directives and policies, EPA standards, NRC licensing requirements, and Occupational Safety and Health Act (OSHA) standards. Major activities include coordination of environmental impact statements from other Departmental Offices involving disposal of spent nuclear fuel, high-level waste, and other Department-owned radioactive materials.

- Provide regulatory assessments and integration of storage, transportation, and disposal considerations for waste forms managed by other Departmental offices, such as Environmental Management, Fissile Materials Disposition, and Nuclear Energy (Naval Reactors), to ensure consistency with applicable interim storage, transportation, and repository requirements.

- Analyze proposed regulatory changes to determine impact on the program and ensure compliance with newly promulgated rules. Provide continued support on emerging regulatory issues that will arise as the projects continue to move forward.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001
• Support activities leading to issuance of the final rule revising the Department's guidelines for determining site suitability for a repository.					
• Support project activities associated with development of the Viability Assessment, particularly completion of the license application plan, including coordination of relevant interactions with the NRC, Advisory Committee on Nuclear Waste (ACNW), NWTRB and Congress.					
• Provide oversight of and guidance on Program Safeguards and Security activities, including interface with NRC, ACNW and International Atomic Energy Agency (IAEA).					
• Coordinate Headquarters review and formal approval of the draft and final environmental impact statement and Records of Decision (ROD), for a repository at Yucca Mountain. Provide coordination with NRC on issues related to the environmental impact statement.					
Total Regulatory Integration	305	364	820	820	820
Planning:					
• Provide liaison with the Nuclear Waste Technical Review Board to address and resolve technical issues associated with site suitability activities.					
• Provide logistical and technical support for OCRWM strategic and program planning, including development of revised OCRWM Strategic and Program Plans.					
• Manage the OCRWM/USGS Memorandum of Agreement with the U.S. Geological Survey for provision of analytical and technical support.					

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001
• Provide technical, graphics, layout, and editorial support in updating the OCRWM Strategic and Program Plan.					
Total Planning	773	1,026	897	897	897
International Waste:					
• Assist in preparing for cooperative bilateral meetings.					
• Assist in preparing for Nuclear Energy Agency Radioactive Waste Management Committee Meeting.					
• Provide input to International Nuclear Waste Management Fact Book.					
• Update Foreign Waste Management Programs Information Book.					
• Provide program briefings to visiting foreign delegations.					
Total International	309	277	309	309	309
Program Management:					
• Improve program and project management systems.					
• Finalize the integrated management policy document, and implement new policies accordingly.					

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001
• Support implementation of improved Departmental management policies					
Total Program Management	1,052	663	844	844	844
HUMAN RESOURCES AND ADMINISTRATION					
Human Resources Development:					
• Update course outlines, instruction guides and lesson plans for quality assurance training.					
• Develop training courses for new Administrative Procedures (AP) or Headquarters Local Procedures (HLP) approved by the Office of Quality Assurance.					
• Conduct essential quality assurance training.					
• Maintain quality assurance training materials to the latest revision of the quality assurance procedures.					
• Purchase needed supplies, non-computer equipment, publications, and other services (such as training, court reporting, etc).					
Total Human Resources	10	90	160	160	160

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001

Audits, Education and Information:

- Develop and submit to Congress OCRWM's Annual Report on the year's activities and expenditures.

- Develop and submit to the Chief Financial Office (CFO), for transmittal to OMB, OCRWM's audited financial statements.

- Develop and submit to the Secretary OCRWM's Annual Assurance Memorandum, required by the Federal Managers' Financial Integrity Act, for incorporation into the Secretary's report to the President.

- Manage the Nuclear Waste Fund investment portfolio by providing monthly investment instructions to the CFO for implementation.

- Develop and submit Departmental responses to final General Accounting Office (GAO) and DOE Inspector General audit reports.

- Provide Program information to customers/stakeholders/public through maintenance of the OCRWM Home Page and management of the Technical Publications Database, which provides access, through the Home Page, to abstracts of recent OCRWM technical publications; respond to public inquiries; and develop and publish *The OCRWM Enterprise*, a semiannual newsletter.

- Comply with Executive Order 12677, by conducting an OCRWM HBCU Undergraduate Scholarship Program that supports approximately 10 academically superior HBCU students.

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001
• Conduct the OCRWM Radioactive Waste Management Graduate Fellowship Program that supports approximately 8 academically superior graduate students pursuing advanced degrees in radioactive waste management-related fields.					
• Initiate the annual audit of the Nuclear Waste Fund.					
• Initiate the development of the Director's Annual Assurance Memorandum to the Secretary.					
Total Audits, Education and Information	1,111	1,162	1,198	1,198	1,198
Information Management:					
• Validate the OCRWM Information Management (IM) Strategic Plan; update the OCRWM IM Multi year Program Plan; develop integrated OCRWM IM Annual Planning Guidance; conduct IM short-range planning; and conduct integrated IM budget planning.					
• Provide technical support to the OCRWM Home Page and the Technical Publications Database.					
• Continue development, implementation and maintenance of an OCRWM information architecture to provide the foundation for the definition, organization, development, maintenance, and management of, and access to, all OCRWM data, records, and information systems.					

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY2000	FY 2001
• Conduct annual Business Management Oversight Project performance assessments of an information management functional area					
• Provide essential level of user support services, training, Help Desk support, and records processing.					
• Maintain support for existing information systems					
Total Information Management	3,668	3,562	3,830	3,830	3,830
Contract Business Management:					
• FY 1997 is the last year that this element included funding for the administrative and operating expenses of the OCRWM technical support contractor at Headquarters. In accordance with Departmental guidance, all funding for Support Service Contractor's are to be displayed in the Program Direction portion of the budget request.					
Total Contract Business Management	0	0	0	0	0

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
NUCLEAR WASTE FUND
(Dollars in thousands)

PROGRAM DIRECTION

I. Mission Supporting Goals and Objectives

Program direction provides overall direction and administrative support for the Nuclear Waste Fund program to manage and dispose of the Nation's spent nuclear fuel and high-level radioactive waste.

Program direction has been grouped into four categories: 1) Salaries and Benefits; 2) Travel; 3) Other Related Expenses; and 4) Support Services.

Salaries and Benefits

This element includes compensation for regular salaries and wages paid directly to civilian full-time permanent and other than full-time permanent employees, other payments that become a part of the employee's basic pay rate and other personnel compensation such as overtime, holiday pay and cash incentive awards. Benefits includes payments such as the employer's share of employee retirement, health and life insurance, accident compensation, Federal Insurance Contribution Act taxes, and Federal Retirement Thrift Savings Plan. Benefits also includes payments for former employees such as severance pay to employees involuntarily separated, and voluntary separation incentives. This includes payments to the unemployment fund, payments of nine percent of final basic pay to the civil service retirement fund for employees who took the early-out or buy-out authority, and payments to the Employees health benefits fund for annuitants.

Travel

This category provides funding for the transportation of Government employees, their per diem allowances while in authorized travel status, and other expenses incidental to travel that are to be paid by the Government either directly or by reimbursing the traveler.

Other Related Expenses

Other related expenses includes funding for building maintenance, rents, communications, utilities, computer/video support, printing and graphics, photocopying, postage, and supplies. The Working Capital Fund was established in FY 1997 by the Office of Human Resources to allocate the cost of common administrative services to the recipient organizations. Activities included in the Working Capital Fund include automated office support, telephone services, postage, printing and graphics, supplies, photocopying, building occupancy, contract closeouts and contract audits.

Support Services

Support Services include the following:

Quality Assurance Technical Support - Provide support in complying with NRC requirements; developing and maintaining the OCRWM Quality Assurance Requirements and Description (QARD); developing Quality Assurance procedures; developing and conducting OCRWM QA training and maintaining QA training records; conducting audits and surveillances of participating organizations and vendors; maintaining QA databases; conducting on site inspections, tests, and reviews of participant and vendor activities

Automated Data Processing Support- Provide support services to assist in the operation and management of the OCRWM communications network and computer facilities

Management & Technical Support Services- Provide support in establishing and monitoring overall program requirements; reviewing and analyzing requirements for implementing plans and baselines; supporting policy analysis and planning activities; preparing and maintaining program technical guidance and program management plans; developing procedures for the review and analysis of project element documents (plans, schedules, etc.); performing independent program and project reviews and analysis

Quality Assurance Management Assessment- Assist OCRWM in the annual quality assurance management assessment to comply with NRC licensing regulations.

Department of Energy Support Services- Provide automated data processing support services

Technical Analysis Support Services- Provide analysis of spent fuel projections

Administrative Support Services- Provide administrative support to the Yucca Mountain Site Characterization Office

II. Funding Schedule:

PROGRAM DIRECTION:	FY 1997 Enacted	FY 1998 Request	FY 1999 Request	Change	% Change	FY 2000 Request
Richland:						
Salaries and Benefits	78	0	0	0	0.00%	0
Travel	5	0	0	0	0.00%	0
Total, Richland	83	0	0	0	0.00%	0
FTE's	1	0	0	0	0.00%	0
Nevada:						
Salaries and Benefits	349	366	384	18	4.89%	403
Total, Nevada	349	366	384	18	4.89%	403
FTE's	4	4	4	0	0.00%	4
Other:						
Salaries and Benefits	1,264	1,252	1,314	62	4.93%	1,378
Travel	7	7	7	0	0.00%	7
Total, Other	1,271	1,259	1,321	62	4.90%	1,385
FTE's	18	17	17	0	0.00%	17
Headquarters-OCRWM:						
Washington D.C.						
Salaries and Benefits	10,143	8,588	8,370	(218)	-2.54%	8,183
Travel	265	257	249	(8)	-3.00%	242
Support Services	8,303	8,014	8,101	87	1.09%	8,326
Other Related Services	2,840	2,679	2,601	(78)	-2.92%	2,594
Total, Washington D.C.	21,551	19,538	19,321	(217)	-1.11%	19,345
FTE's	103	79	65	(14)	-17.72%	57

II. Funding Schedule:

PROGRAM DIRECTION:	FY 1997 Enacted		FY 1998 Request	FY 1999 Request	Change	% Change	FY 2000 Request
Yucca Mtn Project Ofc Nevada							
Salaries and Benefits	10,070		10,363	10,255	(108)	-1.04%	10,346
Travel	442		442	429	(13)	-2.94%	416
Support Services	25,505		27,860	26,177	(1,683)	-6.04%	27,822
Other Related Services	2,764		2,652	2,602	(50)	-1.89%	2,642
Total, Yucca Mountain Proj. Ofc	38,781		41,317	39,463	(1,854)	-4.49%	41,226
FTE's	106		106	101	(5)	-4.72%	100
GRAND TOTAL PROGRAM DIRECTION							
Salaries and Benefits	21,904		20,569	20,323	(246)	-1.20%	20,310
Travel	719		706	685	(21)	-2.93%	665
Support Services	33,808		35,874	34,278	(1,596)	-4.45%	36,148
Other Related Services	5,604		5,331	5,203	(128)	-2.40%	5,236
Total, Program Direction	62,035		62,480	60,489	(1,991)	-3.19%	62,359
FTE's	232	*	206	187	(19)	-9.22%	178

* Actual FTE usage in FY 1997 was 225

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
Salaries and Benefits:					
In order to comply with the DOE's Strategic Alignment Initiative (SAI), the Program will reduce FTEs from 206 in FY 1998 to 187 in FY 1999. Fourteen FTEs (8 percent of the workforce) will be reduced at Headquarters and five FTEs (3 percent reduction of the workforce) will be reduced at the Yucca Mountain Project Office in Nevada. The cost associated with a reduction in force is approximately $45K per FTE.					
Total Salaries and Benefits	**21,904**	**20,569**	**20,323**	**20,310**	**20,540**
Travel:					
Includes all costs of transportation of persons, subsistence of travelers, and incidental travel expenses in accordance with Federal travel regulations which are directly chargeable to OCRWM. In each fiscal year, costs are being reduced as the number of employees on-board decreases.					
Total Travel	**719**	**706**	**685**	**665**	**640**
Other Related Expenses:					
Includes funding for building maintenance, rents, communications, utilities, computer/video support, printing and graphics, photocopying, postage, supplies and common administrative services. In each fiscal year, costs are being reduced as the number of employees on-board decreases.					
Other Related Expenses	**5,604**	**5,331**	**5,203**	**5,236**	**5,031**

III. Performance Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
Support Services:					
Includes all costs which are defined as advisory and assistance services acquired by contract from non-governmental services to support or improve the OCRWM organization. In FY 1999, support services have been reduced by 4.5 percent from FY 1998.					
Total Support Services	**33,808**	**35,874**	**34,278**	**36,148**	**30,565**

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
FY 1999 CONGRESSIONAL BUDGET REQUEST
SUPPORT SERVICES
(000's)

	FY 1997 Enacted	FY 1998 Enacted	FY 1999 Request	FY 2000 Request	FY 2001 Request
HEADQUARTERS SUPPORT SERVICES:					
Technical Support Services					
Quality Assurance	630	1,195	1,328	1,328	1,328
Technical Analysis	200	450	225	450	225
Subtotal	**830**	**1,645**	**1,553**	**1,778**	**1,553**
Management Support Services					
Management & Technical Services	3,866	2,755	2,716	2,716	2,716
Automated Data Processing (ADP) Services	2,700	2,743	2,925	2,925	2,925
Quality Assurance Management Assessment	382	344	382	382	382
Human Resources Support Services	525	527	525	525	525
Subtotal	**7,473**	**6,369**	**6,548**	**6,548**	**6,548**
TOTAL HEADQUARTERS SUPPORT SERVICES	**8,303**	**8,014**	**8,101**	**8,326**	**8,101**
YMSCO SUPPORT SERVICES:					
Technical Support Services					
Quality Assurance	7,300	8,513	8,603	8,603	8,603
Envionmental Impact Statement (EIS)	3,726	5,899	3,938	5,583	225
Subtotal	**11,026**	**14,412**	**12,541**	**14,186**	**8,828**
Management Support Services					
Management & Technical Services	5,533	9,814	9,970	9,970	9,970
Automated Data Processing (ADP) Services	7,933	2,698	2,698	2,698	2,698
Administrative Support	1,013	936	968	968	968
Subtotal	**14,479**	**13,448**	**13,636**	**13,636**	**13,636**
TOTAL YMSCO SUPPORT SERVICES	**25,505**	**27,860**	**26,177**	**27,822**	**22,464**

TOTAL PROGRAM SUPPORT SERVICES	**33,808**	**35,874**	**34,278**	**36,148**	**30,565**